



# IFE Level 2 Certificate in Passive Fire Protection

**Qualification Number: 603/3640/7**

## Introduction

The IFE Level 2 Certificate in Passive Fire Protection has been developed by the Institution of Fire Engineers (IFE) and the Association for Specialist Fire Protection. The content and structure of the qualification has been established to cover the basic knowledge and understanding required by those working in the passive fire protection industry.

## Aims of the Qualification

This qualification has been designed to recognise:

- basic knowledge and understanding related to fire science and human behaviour that affects the requirements for passive fire protection
- basic knowledge of the main active fire protection systems and how these systems align with passive fire protection measures
- specialist technical understanding of passive fire protection measures
- knowledge of the factors that affect effective passive fire protection measures
- specialist understanding that supports effective performance in the workplace

## Target Audience

This qualification will be appropriate for individuals who are directly engaged in installing passive fire protection measures or who work with equipment and materials relevant to passive fire protection measures. It will be of interest to those who are entering into roles involving passive fire protection and who need to demonstrate key understanding prior to commencing work and also to those who are already employed and who need to demonstrate that they have acquired the key knowledge and understanding relevant to their roles. The qualification will be specifically relevant to the following roles:

- Senior installers of passive fire protection measures
- Team leaders/supervisors working in passive fire protection roles
- Site supervisors
- Technical sales staff
- Contract supervisors

## Learning Outcomes

Candidates who achieve this qualification should be able to:

- Demonstrate basic understanding of fire science, and the role of passive fire protection in a holistic approach to fire safety in buildings
- Demonstrate technical understanding of **two** the following passive fire protection areas:
  - Fire Protection to the structural frame of the building and flame retardant coatings
  - Fire resisting walls, floors and ceilings and fire resistant glazing
  - Fire stopping and penetration seals, cavity barriers, ductwork and dampers and the building envelope
  - Fire resisting doors, industrial shutters and associated hardware.

## Qualification Structure

The qualification consists of a single unit.

The unit is made up of two sections:

- Fire and Fire Protection
- Installation of Passive Fire Protection Measures

## Form of Assessment

The assessment takes the form of one 90 minute examination.

The examination will be structured in two sections:

Section 1: This section of the examination will address section 1 of the syllabus ie Fire and Fire Protection. This assessment will comprise short questions. These questions will target all aspects of the content of section 1 of the unit. There will be 20 marks available. Candidates should answer **all** of the questions in this section of the examination.

Section 2: This section of the examination will address section 2 of the syllabus ie Installation of Passive Fire Protection Measures. It will be divided into four parts reflecting the four different passive fire protection measures covered by this section of the syllabus. Candidates will be required to select **two** options from the four different fire protection measures. Each of the four options is weighted equally and 30 marks will be available for each section. There are therefore 60 marks available for this section of the examination **based on completion of two options**. Candidates should be aware that marks are available only for two options; candidates who answer questions from more than two optional areas will not receive additional marks for this as only two options will be counted towards the final mark.

In order to achieve a Pass, candidates will be required to attain at least 50% of the marks available to them (ie 40 of the 80 marks available).

## Grading and Certification

Successful candidates are awarded a Pass Certificate. The qualification is not graded and the certificate will show that candidates have attained a "Pass".

## Entry Requirements

There are no formal entry requirements.

## Qualification Learning Time

The length of time needed to prepare for this examination will vary depending upon the starting point for each individual.

Total qualification time is 180 hours.

- 178 hours of study and exam preparation. Study may be self-study but the IFE recommends that candidates undertake at least 20 hours of direct training. (Please see the section on recommended reading below.)
- 2 hours of assessment (directed time) ie one examination.

## Qualification Level

This qualification has been designed to enable candidates to demonstrate that they have attained skills and knowledge at Level 2. Other types of qualifications that are set at Level 2 include Level 2 NVQs, Level 2 Functional Skills and GCSE - grades 9, 8, 7, 6, 5, 4 or grades A\*, A, B, C.

The qualifications regulator, Ofqual, has provided the following descriptors to illustrate the knowledge and skills expected from those who hold qualifications at Level 2.

### Level 2 Knowledge descriptor

The holder of a qualification at level 2:

- Has knowledge and understanding of facts, procedures and ideas in an area of study or field of work to complete well-defined tasks and address straightforward problems.
- Can interpret relevant information and ideas.
- Is aware of a range of information that is relevant to the area of study or work.

### Level 2 Skills descriptor

The holder of a qualification at level 2 can:

- Select and use relevant cognitive and practical skills to complete well-defined, generally routine tasks and address straightforward problems.
- Identify, gather and use relevant information to inform actions.
- Identify how effective actions have been.

## Progression

Candidates who are successful in achieving the IFE Level 2 Certificate in Passive Fire Protection will be able to build on their learning and progress to the IFE Level 3 Certificate in Passive Fire Protection.

Candidates who wish to broaden their knowledge and understanding at level 2 could consider working towards other qualifications at Level 2 that address this specialist area.

## Reasonable Adjustments

The IFE permits reasonable adjustments to be made where candidates have disabilities (including medical conditions and learning disabilities such as Dyslexia). The IFE's policy on reasonable adjustment aims to enable candidates with disabilities and other difficulties to access the IFE qualifications without comprising the assessment process or the validity of the certificate awarded.

The policy, which includes the arrangements for applying for reasonable adjustments, is published on the IFE's website. The IFE will consider all requests for reasonable adjustments. All requests for reasonable adjustments must be submitted to the IFE.

## Recommended Reading

Candidates should be aware that this reading list is **advisory** rather than definitive. Candidates should use the syllabus for the examination as their guide in deciding what reading materials they need to help them prepare for the examination – please see pages 7-14 below. The IFE recommends that all candidates should read widely in order to extend the depth and breadth of their knowledge and understanding.

Candidates are also advised to review past examination papers. Past papers, together with the associated examiner reports on the papers, can be downloaded, free of charge, from the IFE website or requested via [exams@ife.org.uk](mailto:exams@ife.org.uk).

The IFE has applied the following criteria in determining which resources should be included on this recommended reading list:

- the resource provides information which will be of benefit to the candidate in their professional life, providing depth and breadth of understanding;
- the resource contains some information that will be relevant to part of the syllabus;
- the resource is recognised by industry professionals as providing valuable information.

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

### Fire Protection to the structural frame of the building and flame retardant coatings

- ASFP TGD 14 Code of practice for the installation and inspection of board systems for the fire protection of structural steel work
- ASFP TGD 11 – Code of practice for the specification and on-site installation of intumescent coatings for fire protection of structural steelwork
- ASFP Yellow Book – Fire protection for structural steel in buildings, 5th Edition. Volume 1. Chapters 1,5 and 6. Annexes A1, A.2.5, A.3.5

### Fire resisting walls, floors and ceilings and fire resistant glazing

- ASFP Purple Book – Fire resisting partitions, 2nd Edition. Chapters 1, 2, 3, 4, 5, 8, 9, 10 and Appendix 1
- Glass and Glazing Federation – A Guide to Best Practice in the Specification and Use of Fire Resistant Glazing

Fire stopping and penetration seals, cavity barriers, ductwork and dampers and the building envelope

- ASFP TGD 17 Code of Practice for the installation and inspection of fire stopping systems in buildings
- ASFP Red Book – Fire-stopping: Linear joint seals, penetration seals & cavity barriers, 4th Edition. Chapters 1,2,3,8,9
- ASFP On-site guide to installing fire stopping
- ASFP Blue Book – Fire resisting ductwork: classified according to BS EN 13501 Parts 3 and 4 European version, 1<sup>st</sup> Edition Chapters 1,2,3,4
- ASFP Blue Book - Fire resisting ductwork tested to BS476 Part 24, 3rd Edition (Volume 1 of 3) Chapters, 1,2,3,5,9
- ASFP Grey Book - Volume 1: Fire dampers (European standards) E (integrity) & ES (integrity and leakage) classified, 2nd Edition Chapters 1,2,3,4

Fire resisting doors, industrial shutters and associated hardware

- BWF-Certificate, Fire Doors and Doorsets Best Practice Guide
- Hardware for fire and escape doors, Code of Practice jointly published by the Door and Hardware Federation and the Guild of Architectural Ironmongers

Relevant to all sections of the syllabus

- ASFP Technical Guidance Document TGD 8 Code of Practice for junctions between different fire protection systems
- ASFP Guide to Passive Fire Protection for Fire Risk Assessors
- ASFP Ensuring Best Practice for Passive Fire Protection in Buildings
- Approved Document B, Volume 1 – Dwellinghouses and Volume 2 – Buildings other than dwelling houses as amended in 2013
- IFE Elementary Fire Engineering Handbook (IFE50)

*Candidates may also refer to the past examination papers which are available from the IFE.*

## **Further Information**

Further information on examination conditions is available in the IFE booklet, *Rules and Information for Candidates Taking IFE Examinations*. This booklet can be downloaded from the IFE's website.

For enquiries, please email: [exams@ife.org.uk](mailto:exams@ife.org.uk)

# Content

## Section 1: Fire and Fire Protection

### 1. Fire science including the chemistry of fire

Assessment Objective	Knowledge, Understanding and Skills
1.1 Describe the fire triangle and the fire tetrahedron and explain the implications for extinguishing fire	<ul style="list-style-type: none"> <li>• The fire triangle</li> <li>• Elements of the tetrahedron</li> <li>• Exothermic reaction</li> <li>• Principles involved in the extinction of fire by:                             <ul style="list-style-type: none"> <li>○ Smothering</li> <li>○ Cooling</li> <li>○ Starvation</li> </ul> </li> <li>• Actions and media to remove elements in the fire triangle/tetrahedron - water, inert gas, foam, vaporising liquids, carbon dioxide and inert gases, dry chemical powders, blanketing, beating</li> </ul>
1.2 Describe the process of fire development	<ul style="list-style-type: none"> <li>• Fire as a chemical process</li> <li>• Stages of fire development:                             <ul style="list-style-type: none"> <li>○ Ignition (incipient)</li> <li>○ Growth</li> <li>○ Flashover</li> <li>○ Fully developed</li> <li>○ Decay</li> </ul> </li> </ul>
1.3 Identify and explain the dangers associated with smoke inhalation	<ul style="list-style-type: none"> <li>• Particles</li> <li>• Vapours</li> <li>• Toxic gases</li> </ul>

### 2. Human behaviour in a fire scenario

Assessment Objective	Knowledge, Understanding and Skills
2.1 Describe the factors that affect behaviour when faced with a threat of fire in a building	<ul style="list-style-type: none"> <li>• Knowledge of building layout</li> <li>• Regularity of the alarm being heard (eg history of false alarms/tests)</li> <li>• Fire drill discipline</li> <li>• Physical state of sleeping, under the influence of alcohol, medication, drugs</li> <li>• Whether able bodied or physically impaired</li> <li>• Friends or family in the building</li> <li>• Whether senses recognise danger eg smell, sight, hearing</li> <li>• Actions of others (ie herd instinct)</li> <li>• Clarity of fire exit signage</li> <li>• Panic</li> </ul>

<p>2.2 Understand the basic principles of means of escape in case of fire</p>	<p>Principles of the following in relation to the means of escape:                      Definition and understanding of the following terms:</p> <ul style="list-style-type: none"> <li>• Means of escape</li> <li>• Occupancy</li> <li>• Construction</li> <li>• Evacuation time</li> <li>• Travel distance</li> <li>• Escape route</li> <li>• Places of safety (reasonable and total)</li> <li>• Management control</li> <li>• Responsible person</li> <li>• Compartmentation</li> </ul>
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### 3. Passive fire protection

Assessment Objective	Knowledge, Understanding and Skills
<p>3.1 Explain what is meant by the term “passive fire protection”</p>	<p>Passive fire protection: components materials and systems that go to make up or sit within the fabric of a building and which do not need any special energisation or command signal to operate</p>
<p>3.3 Explain the primary purpose of passive fire protection</p>	<p>Control the spread of fire and smoke within a given fire compartment for a prescribed period of time</p>

### 4. Building performance in fire

Assessment Objective	Knowledge, Understanding and Skills
<p>4.1 Describe factors that affect the fire resistance of a building and components within the building</p>	<p>Factors to include:</p> <ul style="list-style-type: none"> <li>• Loadbearing capacity – the ability of the building’s supports system to remain intact for a specified period of time</li> <li>• Integrity – ensuring that no gaps of sufficient size open up which allow penetration of hot gases, smoke and flames</li> <li>• Insulation – properties of the of the unexposed face of a compartment</li> </ul>
<p>4.2 Describe how loadbearing capacity of a building is supported and state the factors affecting the effectiveness of each type of system</p>	<p>Building support systems:</p> <ul style="list-style-type: none"> <li>• Structural steel</li> <li>• Reinforced concrete</li> <li>• Timber</li> </ul>
<p>4.3 Describe the factors affecting the fire integrity of a building’s</p>	<ul style="list-style-type: none"> <li>• Factors - penetrations through floors/walls in form of pipes, cable, ducting</li> </ul>

structure and identify methods to preserve integrity	<ul style="list-style-type: none"> <li>• Methods of providing fire resistance</li> </ul>
4.4 Describe fire growth and spread	<p>Measured in terms of how the material will:</p> <ul style="list-style-type: none"> <li>• Ignite</li> <li>• spread flame (over their surface)</li> <li>• release heat (rate of/fire propagation)</li> <li>• be combustible to any extent at all</li> <li>• produce flaming droplets and smoke (not used in UK regulations)</li> </ul>

## 5. Active Fire Protection

Assessment Objective	Knowledge, Understanding and Skills
5.1 Explain what is meant by the term “active fire protection”	<ul style="list-style-type: none"> <li>• Active fire protection: systems that need special energisation or command signal to operate</li> </ul>
5.2 Describe smoke and heat detection alarm systems that might be present	<ul style="list-style-type: none"> <li>• Smoke detection systems and how they are activated                             <ul style="list-style-type: none"> <li>○ Ionisation smoke detectors</li> <li>○ Optical smoke detectors</li> <li>○ Aspirating smoke detectors</li> <li>○ Optical beam detectors</li> </ul> </li> <li>• Heat detection systems and how they are activated                             <ul style="list-style-type: none"> <li>○ Fixed temperature heat detectors</li> <li>○ Rate-of-rise detectors</li> <li>○ Electronic sounders</li> <li>○ Bell</li> <li>○ Visual indicators</li> <li>○ Voice alarms</li> </ul> </li> </ul>
5.3 Describe the firefighting equipment available within a building and explain its operation/use in tackling fire	<ul style="list-style-type: none"> <li>• Portable fire extinguishers</li> <li>• Fire blankets</li> <li>• Wet and dry rising mains</li> <li>• Gaseous fire suppression systems</li> </ul>
5.4 Describe the fire suppression equipment available within a building and explain its operation/use in tackling fire	<ul style="list-style-type: none"> <li>• Sprinkler systems                             <ul style="list-style-type: none"> <li>○ Wet pipe</li> <li>○ Dry pipe</li> <li>○ Alternate</li> <li>○ Pre-action</li> </ul> </li> <li>• Deluge systems</li> <li>• Mist systems</li> </ul>
5.5 Explain how signage and emergency lighting is used to improve the fire safety in a building	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Signage location</li> <li>• Emergency lighting</li> <li>• Emergency lighting location</li> </ul>

## Section 2: Installation of Passive Fire Protection Measures

### Introduction

Candidates taking the Level 2 Certificate in Passive Fire Protection will be required to answer questions on **two** of the four options presented below.

### Option 1: Fire Protection to the structural frame of the building and flame retardant coatings

Assessment Objective	Knowledge, Understanding and Skills
1.1 Identify the factors affecting the fire resistance of concrete frames and describe the behaviour of concrete in fire	<ul style="list-style-type: none"> <li>• Properties of concrete</li> <li>• Behaviour of structural concrete in fire</li> <li>• Cast-in concrete and precast concrete</li> </ul>
1.2 Identify the factors affecting the fire resistance of timber frames and describe the behaviour of timber in fire	<ul style="list-style-type: none"> <li>• Heavy timber construction</li> <li>• Lightweight timber framing</li> <li>• Use of sacrificial timber</li> <li>• Use and effect of fire resisting materials</li> </ul>
1.3 Identify the factors affecting the fire resistance of steel frames and describe the behaviour of steel frames in fire	<ul style="list-style-type: none"> <li>• Effect of heat</li> <li>• Effect of load</li> <li>• Effect of size (thickness)</li> <li>• Behaviour in fire</li> </ul>
1.4 Describe fire resistant materials that can be applied to structural designs and explain factors affecting installation and performance	<ul style="list-style-type: none"> <li>• Reactive (intumescent) paint coatings</li> <li>• Plaster or cementitious-based coating systems to structural steel sections</li> <li>• Cladding systems made from fire-resisting boards or stone wool products</li> <li>• Types of fire protection boards</li> </ul>
1.5 Describe the processes for application/installation of protection methods and the processes for remedial and repair actions	<ul style="list-style-type: none"> <li>• Profile</li> <li>• Box</li> <li>• Solid</li> <li>• Application/installation of methods identified in 1.4 above</li> <li>• Factors effecting effectiveness of application/installation</li> </ul>
1.6 Describe inspection and quality assurance processes	<ul style="list-style-type: none"> <li>• Site inspections</li> <li>• Product inspection</li> <li>• Installation inspection</li> <li>• Ongoing maintenance</li> </ul>

**Option 2: Fire resisting walls, floors and ceilings and fire resistant glazing**

Assessment Objective	Knowledge, Understanding and Skills
2.1 Describe the function, composition and performance characteristics of fire resisting walls, floors and ceilings	<ul style="list-style-type: none"> <li>• Fire walls</li> <li>• Fire resisting floors</li> <li>• Compartment walls and floors</li> <li>• Fire resisting ceilings</li> <li>• Fire resisting partitions</li> <li>• Firefighting shafts and stairwells</li> </ul>
2.2 Describe the function, composition and performance characteristics of active fire barrier systems	<ul style="list-style-type: none"> <li>• Vertical active fire curtain barriers</li> <li>• Horizontal active fire curtain barriers</li> <li>• Folded or pleated fire curtain barriers</li> </ul>
2.3 Describe the factors affecting the degree of fire resistance required	<ul style="list-style-type: none"> <li>• The specified fire resistance period</li> <li>• Height of the top floor above ground and the intended use of the building</li> <li>• Whether fire resistance is expected from one side or both sides of the barrier</li> <li>• The type of fire performance required ie stability, integrity and insulation</li> </ul>
2.4 Describe different glazing options and explain the factors to be considered when selecting and implementing options	<ul style="list-style-type: none"> <li>• Integrity rated glazing                             <ul style="list-style-type: none"> <li>○ Wired glass</li> <li>○ Laminated float glass</li> <li>○ Modified toughened glass</li> <li>○ Borosilicate glass</li> <li>○ Glass ceramic</li> <li>○ Partially insulating organic interlayer technology</li> </ul> </li> <li>• Insulation rated glazing                             <ul style="list-style-type: none"> <li>○ Water content gel interlayers between toughened glass plates</li> </ul> </li> <li>• Laminated composites combining a hard intumescent interlayer between annealed glass</li> </ul>
2.5 Explain how the framing and support structure affects the ability of glass to perform its function	<ul style="list-style-type: none"> <li>• Timber</li> <li>• Steel and aluminium</li> <li>• Composite frames</li> </ul>

### Option 3: Fire stopping and penetration seals, cavity barriers, ductwork and dampers and the building envelope

Assessment Objective	Knowledge, Understanding and Skills
3.1 Explain the purpose of fire stopping and describe the products and systems that may be used to achieve fire stopping	<ul style="list-style-type: none"> <li>• Penetration seals</li> <li>• Linear joint seals</li> <li>• Small cavity barriers</li> <li>• Large cavity barriers</li> <li>• Open state cavity barriers</li> </ul>
3.2 Explain the factors to be considered when selecting and installing fire stopping	<ul style="list-style-type: none"> <li>• Fire resistance</li> <li>• Preventing conduction of temperatures along the service to the side isolated from the fire</li> <li>• Providing service supports</li> <li>• Use of penetration sealing systems</li> <li>• Use of loadbearing seals</li> </ul>
3.3 Describe fire stopping and sealing systems and explain the factors relevant to their use and installation	<ul style="list-style-type: none"> <li>• Horizontal cable tray penetration – Mortars, Plugs/blocks, Bags / pillows</li> <li>• Horizontal pipe penetration - Pipe closures (plastic pipes only), Sealants (metal pipes only)</li> <li>• Sealing of blank opening – Mortars, Plugs/blocks, Coated batts</li> <li>• Horizontal multiple penetration – Mortars, Plugs/blocks, Coated batts</li> <li>• Temporary multiple horizontal penetration - Bags / pillows. (Note: If adequately supported some bags / pillows can also be used for vertical penetrations), Plugs / blocks</li> <li>• Cable penetration – Mortar, Coated batts, Sealants</li> <li>• Vertical duct penetration – Mortar, Mineral fibre and sealant/mastic</li> <li>• Vertical pipe penetration - Pipe closures (plastic pipes only), Sealants (metal pipes only)</li> <li>• Multiple penetrations (vertical and horizontal) – Mortar, Coated batts, Pipe closures (plastic pipes only), Sealants (metal pipes only), Plugs/blocks</li> <li>• Vertical and horizontal cable penetration – Mortar, Coated batts</li> <li>• Movement joints – Sealants, Foam, Preformed elastomeric seals, Mineral fibre and sealant/mastic coatings</li> <li>• Horizontal duct penetration- Mortar, Mineral fibre and sealant/mastic</li> <li>• Fire (including cavity) barrier - Coated batts, Mineral wool curtains, Woven textiles, Ridged boards</li> </ul>
3.4 Describe the uses of ductwork and explain the considerations in relation to selection and	<ul style="list-style-type: none"> <li>• Range of uses eg ventilation, smoke extract, kitchen extract and pressurisation</li> <li>• Criteria applied to fire resisting ductwork: stability, integrity, insulation</li> </ul>

installations of fire-resistant ducting.	
3.5 Explain the methods used to maintain the fire resistance of walls and floors penetrated by ventilation ducts	<ul style="list-style-type: none"> <li>• Protection using fire dampers</li> <li>• Protection using fire resisting enclosures</li> <li>• Protection using fire resisting ductwork (including types of ductwork)</li> </ul>
3.6 Describe the use of different types of dampers and explain the considerations in the selection and installation fire damper systems	<ul style="list-style-type: none"> <li>• Types to include: curtain fire dampers, intumescent fire dampers, multi-blade fire dampers, single blade fire dampers, multi-section dampers, leakage classified fire dampers, insulated fire dampers, smoke control damper, fusible link</li> </ul>
3.7 Describe the factors that affect the construction and design of the building envelope and the implications for building in fire protection.	<ul style="list-style-type: none"> <li>• Fire-resisting external walls</li> <li>• Curtain walling systems</li> <li>• Cladding systems</li> <li>• Insulation applied to outside of buildings</li> <li>• Façade</li> </ul>

**Option 4: Fire resisting doors, industrial shutters and associated hardware**

<b>Assessment Objective</b>	<b>Knowledge, Understanding and Skills</b>
4.1 Explain the role of fire doors and the construction of different types of door	<ul style="list-style-type: none"> <li>• Different uses and protection against different hazards</li> <li>• Operation of doors – door closing devices, electrically powered hold open devices, door co-ordinator devices, exit devices</li> <li>• Difference between door assemblies and doorsets</li> <li>• Materials used in construction</li> <li>• Implications of errors in manufacturing, installing or maintaining fire doors</li> <li>• Locations where fire doors should be fitted</li> <li>• Purpose and construction of fire shutters</li> </ul>
4.2 Describe the components of a fire doorset or assembly	<ul style="list-style-type: none"> <li>• Door leaf</li> <li>• Door frame</li> <li>• Door ironmongery</li> <li>• Air transfer grills</li> <li>• Intumescent seals</li> <li>• Smoke seals</li> <li>• Glazing apertures</li> <li>• Signage</li> <li>• Fire resisting rolling shutters</li> </ul>
4.3 Describe the factors relevant to fire door installation	<ul style="list-style-type: none"> <li>• Delivery and storage prior to installation</li> <li>• Checks</li> <li>• Finishing doors on site/coatings</li> <li>• Fitting the frame, door leaf, ironmongery, seals</li> <li>• Post installation checks</li> </ul>
4.4 Explain the considerations in relation to the ongoing use of fire doorsets and assemblies	<ul style="list-style-type: none"> <li>• Ongoing wear and tear</li> <li>• Maintenance</li> <li>• Inspection regime</li> </ul>