Engineering Council

Building Services Discipline Annex

to the UK Standard for Professional Engineering Competence and Commitment
Contextualised for Higher-Risk Buildings (UK-SPEC HRB)

First edition

Published December 2023

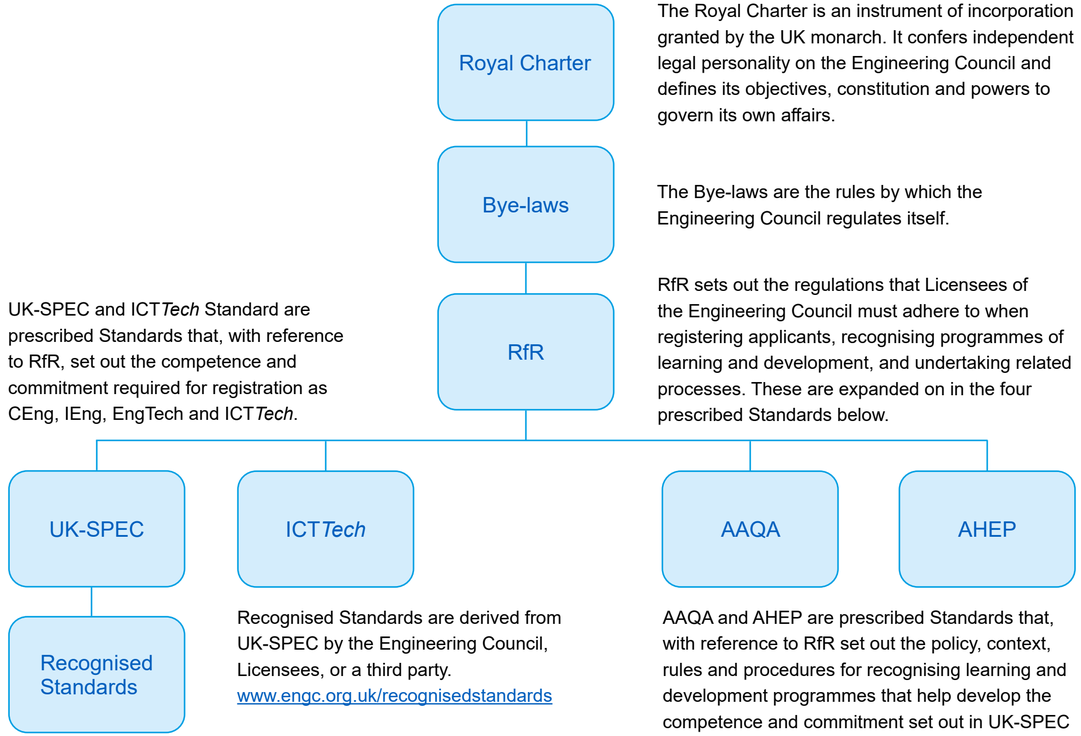
Hierarchy of regulations and standards

The Engineering Council is the UK's regulatory body for the engineering profession. It operates under a Royal Charter and is governed by a Board that represents UK Licensees as well as individuals from industries and sectors with an interest in the regulation of the profession.

This document is one in a series of closely related publications:

- **Regulations for Registration (RfR)**
- **Regulations for Licensing (RfL)**
- **The UK Standard for Professional Engineering Competence and Commitment (UK-SPEC)**
- **Information and Communications Technology Technician Standard (ICT*Tech* Standard)**
- **Approval and Accreditation of Qualifications and Apprenticeships (AAQA)**
- **Accreditation of Higher Education Programmes (AHEP)**

The Engineering Council publishes these documents on behalf of the UK engineering profession, with whom they were developed and are kept under review. The relationship between these publications is:



The Engineering Council also publishes policy statements, guidance for institutions and guidance for individuals. These, along with all the publications listed above, are available on the Engineering Council website: www.engc.org.uk

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Foreword

Following the Grenfell Tower tragedy in 2017, Dame Judith Hackitt, commissioned by the UK Government, undertook an independent review of UK building regulations and fire safety: 'Building a Safer Future' . This report identified inconsistency in the processes and standards for assuring the skills, knowledge, experience and behaviours of those working on higher-risk buildings (HRBs), constituting a major flaw in the current regulatory system.

In response, a Competence Steering Group was set up under the auspices of the Industry Response Group and subsequently published two reports – Raising the Bar (2018) and Setting the Bar (2020). These reports led to development of the BSI 8670. This code of practice sets core building safety criteria for bodies that assess the competence of designers, contractors, fire risk assessors, building managers and specialist technical or corporate roles including engineers/technicians working on higher-risk buildings.Dame Judith's report informed drafting of building safety legislation which led to the Building Safety Act 2022. The intention is to ensure that everyone undertaking design work or building work is competent to do their work in a way that ensures compliance with building regulations.

In response to these reports, the Engineering Council developed UK-SPEC HRB as a Proprietary Standard designed to assess the competence and commitment of individual engineers and technicians working on higher-risk buildings in the UK. UK-SPEC HRB incorporates the criteria from BSI 8670 and sets out a sector-specific competence framework consisting of a core document and discipline annexes. Demonstrating competence could involve registration against the core framework only, or a combination of the discipline annexes: Fire Engineering, Structural Engineering and Building Services Engineering.

Building Services Annex for the Engineering Technician (EngTech) Standard

Engineering Technicians apply proven techniques and procedures to the solution of practical engineering problems.

Engineering Technicians shall demonstrate:

- Engineering knowledge and understanding to apply technical and practical skills
- Evidence of their contribution to the design, development, manufacture, commissioning, decommissioning, operation or maintenance of products, equipment, processes or services
- Supervisory or technical responsibility
- Effective interpersonal skills in communicating technical matters
- The ability to operate in accordance with safe systems of work and to demonstrate appropriate understanding of the principles of sustainability
- Commitment to professional engineering values

An Engineering Technician will be able to demonstrate their competence in all of the areas listed, but the depth and extent of their experience and competence will vary with the context, nature and requirements of their role. They will demonstrate a level of competence and commitment in each area, (AA1–EE5), at a level which is consistent with their specific role. It is to be expected that they will have a higher level of competence in some areas than others and their role may provide limited experience in certain areas. However, they need to demonstrate an understanding of, and familiarity with, the key aspects of competence in those areas of limited experience as a minimum requirement while demonstrating higher levels of competence in those areas which are critical to their role. Overall, they will demonstrate an appropriate balance of competences to perform their role effectively at Engineering Technician level.

The examples of evidence are intended as guidance to help identify activities that might demonstrate the required competence and commitment for Engineering Technician registration. They are intended as examples only as the most appropriate evidence will vary with each individual role. The list is not exhaustive and other types of evidence might be valid. There is no requirement to provide multiple examples of evidence for each area of competence, but examples from two or three projects or tasks would be useful.

† It is not expected that applicants will necessarily meet all the listed criteria, but they will be expected to demonstrate competence against a substantial proportion of the scope, using a variety of sources and types of evidence, wherever this is relevant to their role. As part of their continuing professional development (CPD), successful applicants have an obligation to remain alert to any changes in their role or responsibilities and ensure the appropriate underpinning knowledge and understanding are updated accordingly. This is applicable throughout the document where "wherever relevant, applicants shall demonstrate the ability to:" is mentioned.

Applicants shall provide evidence from the HRB-specific criteria when developing their portfolio across the AA1-EE5 competences. Licensees' Professional Review assessors may request further evidence across any or all of the criteria.

Competence		Scope	
AA. Knowledge and understanding **Engineering Technicians shall use engineering knowledge and understanding to apply technical and practical skills.** This competence is about having knowledge of fire, structural and life safety, legislation, technologies, standards and practices relevant to higher-risk buildings (HRBs) and having evidence of maintaining and applying this knowledge.	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 1. Review and select appropriate fire, structural and building life safety systems and principles, throughout the building life cycle of HRBs*.	**Fire Science** • Principles of heat transfer • Properties of materials • Principles of fire chemistry • Principles of fire dynamics **Human Behaviour and Evacuation** • Human behaviour and physiological response to fire • Life safety design concepts and practice **Fire Safety Design and Specification** • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppression systems **Fire Prevention** • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others	• Access and facilities for fire and emergency services **Structural Safety** • Structural design / fixing of cladding / facade at height • Secondary fixings specification and design • Disproportionate collapse **Protection from Falling or Collision** • Stair safety • Guarding / balustrades • Balconies **Public Health** • Air quality / ventilation • Above ground drainage • Water storage • Combustion appliances **Building Services** • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities **Building Fabric** • Interstitial condensation / corrosion • Maintenance • Glazing and glazing systems

Examples of evidence	HRB specific criteria
• Formal training related to your role in the application of relevant fire, structural and building life safety systems, as well as the principles and practices that are important throughout the building life cycle of HRBs • Learning and developing the engineering knowledge needed to work in an industry area or discipline where the application of relevant fire, structural and building life safety systems, principles and practices are required • Understanding the current and emerging technology and technical best practice principles and practices throughout the building life cycle of HRBs, in the relevant fire, structural and building life safety systems • Developing a broader and deeper knowledge base through research and experimentation in the relevant fire, structural and building life safety systems, principles and practices that are important throughout the building life cycle of HRBs • Learning and developing new engineering theories and techniques on the relevant fire, structural and building life safety systems, principles and practices that are important throughout the building life cycle of HRBs	Wherever relevant, applicants shall demonstrate the knowledge and understanding of†: • The principles of fire propagation and control within buildings including the properties and influences of materials, interaction of systems and control processes • The effects of fire / emergencies within buildings on human behaviours and how this affects the safe evacuation of the building • Being familiar with the current and emerging fire legislation and code compliances with respect to HRBs for building services design, application, and installation • The design concepts of appropriate fire detection and protection systems to address specific risks within buildings to ensure the safety of occupants and their safe escape • The building and its systems likely to react in the event of a fire / emergency. Consider the building as system and ensure correct function, integration and co-ordination of all fire / life safety systems and interfaces • The commissioning strategy and operating regimes for fire detection and protection systems in relation to the building structure and means of escape • The need for access and maintenance principles and document within the design principles and operating and maintenance procedures • The golden thread of information on any development, design, application and integration fire safety and evacuation systems including any related life critical sub-systems * See Glossary: ‘building life cycle’ † See p5

Competence		Scope
AA. Knowledge and understanding		

Examples of evidence	HRB specific criteria
• Recognising, consulting with, updating and applying the golden thread of information on any development / design / application / integration for HRB fire safety, structural and building life safety systems. This will include any related life critical sub-systemsapplying the golden thread of information on any development / design / application / integration for HRB fire safety, structural and building life safety systems. This will include any related life critical sub-systems	

Competence		Scope	
AA. Knowledge and understanding	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 2. Use appropriate scientific, technical, engineering and information management principles to integrate fire, structural and building life safety systems throughout the building life cycle of HRBs*.	**Fire Science** • Principles of heat transfer • Properties of materials • Principles of fire chemistry • Principles of fire dynamics **Human Behaviour and Evacuation** • Human behaviour and physiological response to fire • Life safety design concepts and practice **Fire Safety Design and Specification** • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppression systems **Fire Prevention** • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others	• Access and facilities for fire and emergency services **Structural Safety** • Structural design / fixing of cladding / facade at height • Secondary fixings specification and design • Disproportionate collapse **Protection from Falling or Collision** • Stair safety • Guarding / balustrades • Balconies **Public Health** • Air quality / ventilation • Above ground drainage • Water storage • Combustion appliances **Building Services** • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities **Building Fabric** • Interstitial condensation / corrosion • Maintenance • Glazing and glazing systems

Examples of evidence	HRB specific criteria
• Conducting technical research and development across all aspects of development / design / application / integration of HRB fire safety, structural and building life safety systems • Developing systems and processes for the design / application / integration of HRB fire safety, structural and building life safety systems and considering new or evolving technology • Conducting complex and / or non-standard technical analyses on the development / design / application / integration of HRB fire safety, structural and building life safety systems • Developing solutions involving complex or multidisciplinary technology in relation to HRB fire safety, structural and building life safety systems • Developing and evaluating continuous improvement systems on HRB fire safety, structural and building life safety systems, including any related life critical sub-systems	Wherever relevant, applicants shall demonstrate the knowledge and understanding of: • The building regulations and appropriate fire safety standards and recognised guidance in respect of life safety systems within HRB • The boundaries and interfaces with other life safety and building systems with appropriate control and monitoring to ensure the operation and function of the system • The levels of risk and design appropriate multidisciplinary systems covering rated fire safety and evacuation systems • The importance of passive fire protection and how these may be impacted the installation of services within the building • The resilience of all Building Services water, electrical, VT and smoke and ventilation systems for firefighting purposes and assess potential risks to loss of supply and develop a strategy to ensure that critical life safety systems are protected with secondary systems where appropriate • Implementing the testing and commissioning strategy for the life safety systems individually and as integrated system to demonstrate function and operation in respect of the design intent eg Black building test • The correct function of the life safety systems and undertake regular performance tests to demonstrate the systems continue to meet the fire safety strategy and systems design intent

Competence		Scope	
BB. Design, development and solving engineering problems **Engineering Technicians shall contribute to the design, development, manufacture, construction, commissioning, decommissioning, operation or maintenance of products, equipment, processes, systems or services in relation to HRBs.**	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 1. Identify problems and apply appropriate theoretical and practical methods to design, construct, commission, operate, maintain, decommission and recycle building engineering processes, systems, services and product, in order to comply with relevant legislation, regulations, statutory guidance and standards of performance applicable to HRBs.	Construction legislation relevant to higher-risk buildings (HRBs) including: **Construction Legislation** • The Building Act 1984 • The Building Safety Act 2022 and Regulations • Building regulations • Approved documents • Approved Document 7: Materials and Workmanship • Building regulations (procedural) • Local acts / enactments • Government communications / circular letters • Sustainable and Secure Buildings Act 2004 • Regulatory Reform (Fire Safety) Order 2005 • Construction (Design and Management) Regulations 2007 • Management of Health and Safety at Work Regulations • Health and Safety at Work Act 1974 • Gas Safety (Installation and Use) Regulations 1998 • Relevant case law • Contract law **Related Guidance** Authoritative guidance as typically published by institutions, industry bodies and individuals including Collaborative Reporting for Safer Structures UK (CROSS-UK). • Royal Institute of British Architects (RIBA) plan of work • Building Services Research and Information Association (BSRIA) plan of work • Civil, criminal, and case law • Contract law • Law of agency • Employment law • The Housing Acts 1985,1988, 1996, 2004 • Housing Health and Safety Rating System • Equalities Act 2010 • Town and Country Planning Act 1990 • Housing and Regeneration Act 2008 • Licensing legislation	

Examples of evidence	HRB specific criteria
• Identifying projects (for technical improvements to products, processes, or systems that are needed to undertake an engineering task within the development / design / application / integration) in regard to HRB fire safety, structural and building life safety systems • Preparing specifications on the development / design / application / integration of HRB fire safety, structural and building life safety system, and taking account of functional and other requirements • Establishing user requirements for improvements in HRB fire safety, structural and building life safety systems • Reviewing specifications and tenders to identify technical issues and potential improvements, with specific focus on elements concerning the development / design / application / integration of HRB fire safety, structural and building life safety systems. These reviews must also consider, contribute, and innovate towards the continuation of the golden thread of information • Conducting technical risk analysis on HRB fire safety, structural and building life safety systems, and identifying mitigation measures • Considering and implementing new and emerging technologies within the development / design / application / integration of HRB fire safety, structural and building life safety systems	Wherever relevant, applicants shall demonstrate the knowledge and understanding of: • The roles of all disciplines forming part of the design, construction and operation teams eg Architect, Structural Engineers, Specialists, Contractors, Manufacturers, Facilities Managers / Engineers • Theoretical and practical methods to the co-ordinated design and development of engineering solutions suitable for HRB to ensure safety in construction, use, maintenance and demolition • Identifying problems and applying appropriate techniques, systems, procedures and methods to undertake the engineering design, construction and operation co-ordinating at all times with other members of the design, construction and facilities management teams • Identifying problems and applying interfaces with static and dynamic life safety systems and co-ordinate the outcomes with other team members to ensure the building and systems are fully compatible and function to the required performance • Repairing, de-construction, dismantling and recycling of products, materials and systems. Contribute towards measures within the procurement, design and construction to provide for future de-construction of the building and systems • Testing and commissioning of the life safety systems individually and as an integrated system to demonstrate function and operation in respect of the design intent eg Black building test • The correct function of the life safety systems and undertake regular performance tests to demonstrate the systems continue to meet the fire safety strategy and systems design intent for the HRB • The Golden Thread by ensuring all appropriate of information with importance on fire safety and means of escape including performance and interfaces of life safety systems, the engineering services and building fabric are fully documented and issued to the appropriate parties throughout the building life cycle

Competence		Scope
BB. Design, development and solving engineering problems	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 2. Identify, organise and apply relevant standards, testing, assessment, site inspection and maintenance procedures for building materials, products, components, assemblies and systems effectively throughout the building life cycle of HRBs.	• British and international product standards • Testing standards, procedures, and interpretation of results • Good practice specification • Product characteristics and performance • System, component or assembly testing and performance • Prototyping / sample panel and testing • Maintenance requirements • Maintenance testing and commissioning of building systems and services

Examples of evidence	HRB specific criteria
• Ensuring that the application of the design within HRB fire safety, structural and building life safety systems, results in the appropriate practical outcome • Implementing design solutions and taking account of critical constraints. This includes due concern for safety, sustainability, and disposal or decommissioning, within HRB fire safety, structural and building life safety systems • Identifying and implementing lessons learned • Evaluating existing designs or processes within the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then identifying faults or potential improvements including risk and life cycle considerations • Actively learning from feedback to improve future design solutions and establish best practice within the development / design / application / integration of HRB fire safety, structural and building life safety systems	Wherever relevant, applicants shall demonstrate the knowledge and understanding of: • Appropriate specification and selection of appropriate materials and products standards as far as they relate to your particular expertise and appreciate those standards, materials and products that have an interface with the design, construction and operational requirements for the life safety systems as designed • Appropriate products, components, assemblies and systems will ensure that the building and its life safety systems operate and perform safely throughout the building life cycle of HRBs • And ensure that the design of the life safety system respects the methods and requirements for ongoing regular maintenance throughout the life of the building to ensure the correct function of the systems and that they are operational at all times • Through inspection, commissioning and testing the quality and suitability of the installed life safety systems

Building Services Annex for the Incorporated Engineer (IEng) Standard

Incorporated Engineers maintain and manage applications of current and developing technology, and may undertake engineering design, development, manufacture, construction and operation.

Incorporated Engineers shall demonstrate:

- The theoretical knowledge to solve problems in established technologies using well proven analytical techniques
- Successful application of the knowledge to deliver engineering tasks or services using established technologies and methods
- Contribution to the financial and planning aspects of projects or tasks and contribution to leading and developing other professional staff
- Effective interpersonal skills in communicating technical matters
- The ability to specify and operate to safe systems of work and to demonstrate appropriate consideration of the principles of sustainability
- Commitment to professional engineering values

An Incorporated Engineer will be able to demonstrate their competence in all of the areas listed, but the depth and extent of their experience and competence will vary with the nature and requirements of their role. They will demonstrate a level of competence and commitment in each area (AA1–EE5) at a level which is consistent with their specific role. It is to be expected that they will have a higher level of competence in some areas than others and their role may provide limited experience in certain areas. However, they need to demonstrate an understanding of, and familiarity with, the key aspects of competence in all areas as a minimum requirement while demonstrating higher levels of competence in those areas which are critical to their role. Overall, they must demonstrate an appropriate balance of competences to perform their role effectively at Incorporated Engineer level.

The examples of evidence are intended as guidance to help identify activities that might demonstrate the required competence and commitment for Incorporated Engineer registration. They are intended as examples only as the most appropriate evidence will vary with each individual role. The list is not exhaustive and other types of evidence might be valid. There is no requirement to provide multiple examples of evidence for each area of competence, but examples from two or three projects or tasks would be useful.

† It is not expected that applicants will necessarily meet all the listed criteria, but they will be expected to demonstrate competence against a substantial proportion of the scope, using a variety of sources and types of evidence, wherever this is relevant to their role. As part of their continuing professional development (CPD), successful applicants have an obligation to remain alert to any changes in their role or responsibilities and ensure the appropriate underpinning knowledge and understanding are updated accordingly. This is applicable throughout the document where “wherever relevant, applicants shall demonstrate the ability to:” is mentioned.

Applicants shall provide evidence from the HRB-specific criteria when developing their portfolio across the AA1-EE5 competences. Licensees’ Professional Review assessors may request further evidence across any or all of the criteria.

Competence		Scope		Examples of evidence	HRB specific criteria
AA. Knowledge and understanding **Incorporated Engineers shall use a combination of general and specialist engineering knowledge and understanding to apply existing and emerging technology.** This competence is about having knowledge of the technologies, standards and practices relevant to HRBs and the applicant's area of practice and having evidence of maintaining and applying this knowledge.	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 1. Maintain and extend a sound theoretical approach to the application of relevant fire, structural and building life safety systems, principles, and practices throughout the building life cycle of HRBs*.	**Fire Science** • Principles of heat transfer • Properties of materials • Principles of fire chemistry • Principles of fire dynamics **Human Behaviour and Evacuation** • Human behaviour and physiological response to fire • Life safety design concepts and practice **Fire Safety Design and Specification** • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppression systems **Fire Prevention** • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others	• Access and facilities for fire and emergency services **Structural Safety** • Structural design / fixing of cladding / facade at height • Secondary fixings specification and design • Disproportionate collapse **Protection from Falling or Collision** • Stair safety • Guarding / balustrades • Balconies **Public Health** • Air quality / ventilation • Above ground drainage • Water storage • Combustion appliances **Building Services** • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities **Building Fabric** • Interstitial condensation / corrosion • Maintenance • Glazing and glazing systems	• Formal training related to your role in the application of relevant fire, structural and building life safety systems, as well as the principles and practices that are important throughout the building life cycle of HRBs • Learning and developing the engineering knowledge needed to work in an industry area or discipline where the application of relevant fire, structural and building life safety systems, principles and practices are required • Understanding the current and emerging technology and technical best practice, principles and practices throughout the building life cycle of HRBs in the relevant fire, structural and building life safety systems • Developing a broader and deeper knowledge base through research and experimentation in the relevant fire, structural and building life safety systems, principles and practices that are important throughout the building life cycle of HRBs • Learning and developing new engineering theories and techniques on the relevant fire, structural and building life safety systems, principles and practices that are important throughout the building life cycle of HRBs • Recognising, consulting with, updating and applying the golden thread of information on any development / design / application / integration for HRB fire safety, structural and building life safety systems. This will include any related life critical sub-systems	Wherever relevant, applicants shall demonstrate the experience of†: • Fire science and the principles of fire propagation and control. Further considering the properties and influences of materials and components used in the construction of buildings, inclusive of the interaction of systems and control processes • Human factors and the effects of fire / emergencies within buildings. Further understanding how this affects the safe evacuation of the building • Current and emerging fire legislation and code compliances with respect to HRBs for building services design, application, and installation • Engineering knowledge to understand the current and emerging technologies and technical best practices in the development, design, application, construction and integration of fire safety and evacuation systems, including all life critical sub-systems • Engineering theories and techniques in how the building and its systems are likely to react in the event of a fire / emergency. Develop technical solutions that consider the building as a system to ensure the integration and coordination of all fire / life safety systems and interfaces • First principles and / or independently peer review commissioning strategies and operating regimes for fire safety and evacuation systems. Including all life critical systems in relation to the building structure and means of escape • Developing the access and maintenance documentation, considering the design principles and operating and maintenance procedures Developing maintenance documentation, considering the design principles and operating and maintenance procedures • Recognising, consulting with, updating and applying the golden thread of information on any development, design, application and integration fire safety and evacuation systems including any related life critical sub-systems * See Glossary: 'building life cycle' † See p17

Competence		Scope	
AA. Knowledge and understanding	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 2. Use a sound evidence-based approach to problem solving to apply relevant principles and technical standards for fire, structural and building life safety systems throughout the building life cycle of HRBs, and support continuous improvement in building safety	**Fire Science** • Principles of heat transfer • Properties of materials • Principles of fire chemistry • Principles of fire dynamics **Human Behaviour and Evacuation** • Human behaviour and physiological response to fire • Life safety design concepts and practice **Fire Safety Design and Specification** • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppression systems **Fire Prevention** • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others • Access and facilities for fire and emergency services	• Collaboration and system integration **Structural Safety** • Structural design / fixing of cladding / facade at height • Secondary fixings specification and design • Disproportionate collapse **Protection from Falling or Collision** • Stair safety • Guarding / balustrades • Balconies **Public Health** • Air quality / ventilation • Above ground drainage • Water storage • Combustion appliances **Building Services** • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities **Building Fabric** • Interstitial condensation / corrosion • Maintenance • Glazing and glazing systems

Examples of evidence	HRB specific criteria
• Conducting technical research and development across all aspects of development / design / application / integration of HRB fire safety, structural and building life safety systems • Developing systems and processes for the design / application / integration of HRB fire safety, structural and building life safety systems and considering new or evolving technology • Conducting complex and / or non-standard technical analyses on the development / design / application / integration of HRB fire safety, structural and building life safety systems. • Developing solutions involving complex or multidisciplinary technology in relation to HRB fire safety, structural and building life safety systems • Developing and evaluating continuous improvement systems on HRB fire safety, structural and building life safety systems, including any related life critical sub-systems	Wherever relevant, applicants shall demonstrate the experience of: • Contributing to all disciplines forming part of the design, construction and operation teams eg Architect, Structural, Fire Engineers, Specialists, Contractors, Manufacturers, Facilities Managers / Engineers • Identifying project or technical requirements and improvements to products, processes, or systems appropriate to the building's fire safety and evacuation systems including all life critical sub-systems • Being a leader and contributing to the co-ordinated design and development of engineering solutions suitable to ensure safety in construction, use, maintenance and demolition. Seek checking and approval at all key milestones • Implementing and evaluating appropriate techniques, systems, procedures and methods to undertake the engineering design, construction and operation co-ordinating at all times with other members of the design, construction and facilities management teams • Identifying and establishing interfaces with static and dynamic life safety systems and co-ordinate the outcomes with other team members to ensure the building and systems are fully compatible and function to the required performance • Considering repair, de-construction, dismantling and recycling of products, materials and systems. Implementing measures within the procurement, design and construction to provide for future de-construction of the building and systems • Preparing specifications and defining operational requirements appropriate to the building's normal and fire safety, ventilation and evacuation systems including all life critical sub-systems • Reviewing specifications, tenders and contractor proposals to identify technical issues, emerging technologies and potential improvements. The review must consider, contribute and innovate towards the continuation of the golden thread of information appropriate to the building's fire safety and evacuation systems including all life critical sub-systems • Implementing suitable testing and commissioning of the life safety systems individually and as an integrated system to demonstrate function and operation in respect of the design intent eg Black building test

Competence		Scope
AA. Knowledge and understanding		

Examples of evidence	HRB specific criteria
	• Operating the correct function of the life safety systems and undertake regular performance tests to demonstrate the systems continue to meet the fire safety strategy and systems design intent for the HRB • Maintaining the Golden Thread by ensuring all appropriate of information with importance on fire safety and means of escape including performance and interfaces of life safety systems, the engineering services and building fabric are fully documented and issued to the appropriate parties throughout the building life cycle

Competence		Scope	
BB. Design, development and solving engineering problems **Incorporated Engineers shall apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate, maintain, decommission and recycle engineering processes, systems, services and products.** This competence is about the ability to identify appropriate methods and approaches to use to undertake a task within their area of practice and to make a significant contribution to the development of a design or process or the maintenance of operations in relation to HRBs.	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 1.Identify, review and select appropriate techniques, procedures, and methods to design, construct, commission, operate, maintain, decommission and recycle building engineering processes, systems, services and products, in order to comply with relevant legislation, regulations, statutory guidance and standards of performance applicable to HRBs.	Construction legislation relevant to higher-risk buildings (HRBs) including: **Construction Legislation** • The Building Act 1984 • The Building Safety Act 2022 and Regulations • Building regulations • Approved documents • Approved Document 7: Materials and Workmanship • Building regulations (procedural) • Local acts / enactments • Government communications / circular letters • Sustainable and Secure Buildings Act 2004 • Regulatory Reform (Fire Safety) Order 2005 • Construction (Design and Management) Regulations 2007 • Management of Health and Safety at Work Regulations • Health and Safety at Work Act 1974 • Gas Safety (Installation and Use) Regulations 1998 • Relevant case law • Contract law **Related Guidance** Authoritative guidance as typically published by institutions, industry bodies and individuals including Collaborative Reporting for Safer Structures UK (CROSS-UK). • Royal Institute of British Architects (RIBA) plan of work • Building Services Research and Information Association (BSRIA) plan of work • Civil, criminal, and case law • Contract law • Law of agency • Employment law • The Housing Acts 1985,1988, 1996, 2004 • Housing Health and Safety Rating System • Equalities Act 2010 • Town and Country Planning Act 1990 • Housing and Regeneration Act 2008 • Licensing legislation	

Examples of evidence	HRB specific criteria
• Identifying projects (or technical improvements to products, processes, or systems that are needed to undertake an engineering task within the development / design / application / integration) in regard to HRB fire safety, structural and building life safety systems • Preparing specifications on the development / design / application / integration of HRB fire safety, structural and building life safety systems and taking account of functional and other requirements • Establishing user requirements for improvements in HRB fire safety, structural and building life safety systems • Reviewing specifications and tenders to identify technical issues and potential improvements, with specific focus on elements concerning the development / design / application / integration of HRB fire safety, structural and building life safety systems. These reviews must also consider, contribute, and innovate towards the continuation of the golden thread of information • Conducting technical risk analysis on HRB fire safety, structural and building life safety systems. and identifying mitigation measures • Considering and implementing new and emerging technologies within the development / design / application / integration of HRB fire safety, structural and building life safety systems	Wherever relevant, applicants shall demonstrate the experience of: • Contributing to all disciplines forming part of the design, construction and operation teams eg Architect, Structural, Fire Engineers, Specialists, Contractors, Manufacturers, Facilities Managers / Engineers • Identifying project or technical requirements and improvements to products, processes, or systems appropriate to the building's fire safety and evacuation systems including all life critical sub-systems • Being a leader and contributing to the co-ordinated design and development of engineering solutions suitable to ensure safety in construction, use, maintenance and demolition. Seek checking and approval at all key milestones • Implementing and evaluating appropriate techniques, systems, procedures and methods to undertake the engineering design, construction and operation co-ordinating at all times with other members of the design, construction and facilities management teams • Identifying and establishing interfaces with static and dynamic life safety systems and co-ordinate the outcomes with other team members to ensure the building and systems are fully compatible and function to the required performance • Considering repair, de-construction, dismantling and recycling of products, materials and systems. Implementing measures within the procurement, design and construction to provide for future de-construction of the building and systems • Preparing specifications and defining operational requirements appropriate to the building's normal and fire safety, ventilation and evacuation systems including all life critical sub-systems • Reviewing specifications, tenders and contractor proposals to identify technical issues, emerging technologies and potential improvements. The review must consider, contribute and innovate towards the continuation of the golden thread of information appropriate to the building's fire safety and evacuation systems including all life critical sub-systems

Competence		Scope
BB. Design, development and solving engineering problems		

Examples of evidence	HRB specific criteria
	• Implementing suitable testing and commissioning of the life safety systems individually and as an integrated system to demonstrate function and operation in respect of the design intent eg Black building test • Operating the correct function of the life safety systems and undertake regular performance tests to demonstrate the systems continue to meet the fire safety strategy and systems design intent for the HRB • Maintaining the Golden Thread by ensuring all appropriate of information with importance on fire safety and means of escape including performance and interfaces of life safety systems, the engineering services and building fabric are fully documented and issued to the appropriate parties throughout the building life cycle

Competence		Scope
BB. Design, development and solving engineering problems	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 2. Contribute to the design and development of engineering solutions through application of relevant standards, testing, site inspection, assessment and maintenance procedures for building materials, products, components, assemblies and systems effectively throughout the building life cycle of HRBs.	• British and international product standards • Testing standards, procedures, and interpretation of results • Good practice specification • Product characteristics and performance • System, component or assembly testing and performance • Prototyping / sample panel and testing • Maintenance requirements • Maintenance testing and commissioning of building systems and services

Examples of evidence	HRB specific criteria
• Identifying and agreeing appropriate research methodologies on the development / design / application / integration of HRB fire safety, structural and building life safety systems • Investigating a technical issue within the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then identifying potential solutions, and determining the factors needed to compare them • Identifying and conducting physical tests or trials on HRB fire safety, structural and building life safety systems • Conducting technical simulations or analysis with regards to the development / design / application / integration of HRB fire safety, structural and building life safety systems • Preparing, presenting, and agreeing design recommendations, with appropriate analysis of risk on the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then taking account of quality, safety, reliability, accessibility, appearance, fitness for purpose, cost, security (including cyber security), intellectual property constraints and opportunities, as well as environmental impact	Wherever relevant, applicants shall demonstrate the experience of: • Assessing the appropriateness of the specification and selection of appropriate materials and products standards as far as they relate to your particular expertise and appreciate those standards, materials and products that have an interface with the design, construction and operational requirements for the building's life safety systems • Implementing new and emerging technologies appropriate to fire safety and evacuation systems including all life critical sub-systems. Be up to date with the current and emerging legislation around HRBs • Assessing and the appropriateness of the selected products, components, assemblies and systems including identifying and conducting physical tests or trials to ensure that the building and its life safety systems operate and perform safely throughout its life cycle • Preparing, presenting, and agreeing design recommendations, with appropriate analysis considering, quality, safety, reliability, accessibility, appearance, fitness for purpose, cost, security (including cyber security), intellectual property constraints and opportunities, and environmental impact • Ensuring that the design, specification and construction of the life safety systems has taken into account of, quality, safety, reliability, accessibility, appearance, fitness for purpose, cost, security (including cyber security), intellectual property constraints. The environmental impact should respect the methods and requirements for ongoing regular maintenance throughout the life of the building to ensure the correct function of the systems and that they are operational at all times are considered

Competence		Scope
BB. Design, development and solving engineering problems	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 3. Implement design solutions for equipment or processes and contribute to their evaluation.	• Design solutions applicable across the life cycle of HRBs

Examples of evidence	HRB specific criteria
• Ensuring that the application of the design within HRB fire safety, structural and building life safety systems, results in the appropriate practical outcome • Implementing design solutions and taking account of critical constraints. This includes due concern for safety, sustainability, and disposal or decommissioning, within HRB fire safety, structural and building life safety systems • Identifying and implementing lessons learned • Evaluating existing designs or processes within the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then identifying faults or potential improvements including risk and life cycle considerations • Actively learning from feedback to improve future design solutions and establish best practice within the development / design / application / integration of HRB fire safety, structural and building life safety systems	Wherever relevent, applicants shall demonstrate the experience of: • Ensuring the application of the design is inclusive of all products, components and systems to implement the fire safety strategy and safety in design, construction and operation for the building • Identifying the constraints of the building, develop and implement fire safety design solutions that consider safety and wellbeing of occupants, sustainability, resilience and future proof in operation, decommissioning and disposal • Evaluating existing building systems and, installation within the designs or processes during construction, commissioning and operation. Make corrective actions and implement lessons learnt, propose alternative solutions. within the development of, design, application and integration of fire safety and evacuation systems, including any related life critical sub-systems • Completing reviews and or audits in operation including feedback from the operators and occupants of the building on its processes and systems. Implement and integrate corrective measures and or development of future design solutions to improve and build on best practice within the development, design for the application and integration of fire safety and evacuation systems, including any related life critical sub-systems

Building Services Annex for the Chartered Engineer (CEng) Standard

Chartered Engineers develop solutions to complex engineering problems using new or existing technologies, and through innovation, creativity and technical analysis.

Chartered Engineers shall demonstrate:

- The theoretical knowledge to solve problems in new and established technologies and to develop new analytical techniques
- Successful application of the knowledge to deliver innovative products and services or taking technical responsibility for complex engineering systems
- Responsibility for the financial and planning aspects of projects, sub-projects or tasks
- Leadership and development of other professional staff through management, mentoring or coaching
- Effective interpersonal skills in communicating technical matters
- Understanding of the safety and sustainability implications of their work, seeking to improve aspects where feasible
- Commitment to professional engineering values

A Chartered Engineer will be able to demonstrate their competence in all of the areas listed, but the depth and extent of their experience and competence will vary with the nature and requirements of their role. They will demonstrate a level of competence and commitment in each area, (AA1–EE5), at a level which is consistent with their specific role. It is to be expected that they will have a higher level of competence in some areas than others and their role may provide limited experience in certain areas. However, they need to demonstrate an understanding of, and familiarity with, the key aspects of competence in all areas as a minimum requirement while demonstrating higher levels of competence in those areas which are critical to their role. Overall, they will demonstrate an appropriate balance of competences to perform their role effectively at Chartered Engineer level.

The examples of evidence are intended as guidance to help identify activities that might demonstrate the required competence and commitment for Chartered Engineer registration. They are intended as examples only as the most appropriate evidence will vary with each individual role. The list is not exhaustive and other types of evidence might be valid. There is no requirement to provide multiple examples of evidence for each area of competence, but examples from two or three projects or tasks would be useful.

† It is not expected that applicants will necessarily meet all the listed criteria, but they will be expected to demonstrate competence against a substantial proportion of the scope, using a variety of sources and types of evidence, wherever this is relevant to their role. As part of their continuing professional development (CPD), successful applicants have an obligation to remain alert to any changes in their role or responsibilities and ensure the appropriate underpinning knowledge and understanding are updated accordingly. This is applicable throughout the document where “wherever relevant, applicants shall demonstrate the ability to:” is mentioned.

Applicants shall provide evidence from the HRB-specific criteria when developing their portfolio across the AA1-EE5 competences. Licensees’ Professional Review assessors may request further evidence across any or all of the criteria.

Competence		Scope	
AA. Knowledge and understanding **Chartered Engineers shall use a combination of general and specialist engineering knowledge and understanding to optimise the application of advanced and complex systems.** This competence is about the ability to understand underpinning technical principles in fire, structural and life safety relevant to the applicant's area of practice and applying them to develop technical solutions. This could involve technical solutions for novel problems or dealing with significant technical complexity. This may involve the integration of a range of technologies and consideration of other factors. This competence requires that an applicant is maintaining and developing their knowledge in their field of practice and not just that required for specific tasks.	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 1. Maintain, extend and develop a sound theoretical approach to application of relevant fire, structural and building life safety systems, principles and practices throughout the building life cycle of HRBs*.	**Fire Science** • Principles of heat transfer • Properties of materials • Principles of fire chemistry • Principles of fire dynamics **Human Behaviour and Evacuation** • Human behaviour and physiological response to fire • Life safety design concepts and practice **Fire Safety Design and Specification** • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppression systems **Fire Prevention** • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others	• Access and facilities for fire and emergency services **Structural Safety** • Structural design / fixing of cladding / facade at height • Secondary fixings specification and design • Disproportionate collapse **Protection from Falling or Collision** • Stair safety • Guarding / balustrades • Balconies **Public Health** • Air quality / ventilation • Above ground drainage • Water storage • Combustion appliances **Building Services** • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities **Building Fabric** • Interstitial condensation / corrosion • Maintenance • Glazing and glazing systems

Examples of evidence	HRB specific criteria
• Formal training related to your role in the application of relevant fire, structural and building life safety systems, as well as the principles and practices that are important throughout the building life cycle of HRBs • Learning and developing the engineering knowledge needed to work in an industry area or discipline where the application of relevant fire, structural and building life safety systems, principles and practices are required • Understanding the current and emerging technology and technical best practice, principles and practices throughout the building life cycle of HRBs, in the relevant fire, structural and building life safety systems • Developing a broader and deeper knowledge base through research and experimentation in the relevant fire, structural and building life safety systems, principles and practices that are important throughout the building life cycle of HRBs • Learning and developing new engineering theories and techniques on the relevant fire, structural and building life safety systems, principles and practices that are important throughout the building life cycle of HRBs • Recognising, consulting with, updating and applying the golden thread of information on any development / design / application / integration for HRB fire safety, structural and building life safety systems. This will include any related life critical sub-systems	Wherever relevant, applicants shall demonstrate the ability to†: • Develop, demonstrate, and extend underpinning knowledge & understanding for fire science and the principles of fire propagation and control. Further considering the properties and influences of materials and components used in the construction of buildings, inclusive of the interaction of systems and control processes • Understand human factors and the effects of fire / emergencies within buildings. Further understanding how this affects the safe evacuation of the building • Understand and be familiar with the current and emerging fire legislation and code compliances with respect to HRBs for building services design, application, and installation • Expand engineering knowledge and understanding of current and emerging technologies and technical best practices in the development, design, application, construction and integration of fire safety and evacuation systems, including all life critical sub-systems • Develop a broader and deeper knowledge base through research and experimentation. Develop and apply engineering theories and techniques in how the building and its systems are likely to react in the event of a fire / emergency. Develop technical solutions that consider the building as a system to ensure the integration and coordination of all fire / life safety systems and interfaces • Develop from first principles and / or independently peer review commissioning strategies and operating regimes for fire safety and evacuation systems. Including all life critical systems in relation to the building structure and means of escape • Develop the access and maintenance documentation, considering the design principles and operating and maintenance procedures • Recognise, consult with, update and apply the golden thread of information on any development, design, application and integration fire safety and evacuation systems including any related life critical sub-systems * See Glossary: 'building life cycle' † See p33

Competence		Scope	
AA. Knowledge and understanding	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 2. Address and develop solutions to complex or challenging building safety problems with significant levels of risk. Apply knowledge and understanding of relevant principles and technical standards to co-ordinate and integrate these into the building design.	**Fire Science** • Principles of heat transfer • Properties of materials • Principles of fire chemistry • Principles of fire dynamics **Human Behaviour and Evacuation** • Human behaviour and physiological response to fire • Life safety design concepts and practice **Fire Safety Design and Specification** • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppression systems **Fire Prevention** • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others • Access and facilities for fire and emergency services	• Collaboration and system integration **Structural Safety** • Structural design / fixing of cladding / facade at height • Secondary fixings specification and design • Disproportionate collapse **Protection from Falling or Collision** • Stair safety • Guarding / balustrades • Balconies **Public Health** • Air quality / ventilation • Above ground drainage • Water storage • Combustion appliances **Building Services** • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities **Building Fabric** • Interstitial condensation / corrosion • Maintenance • Glazing and glazing systems

Examples of evidence	HRB specific criteria
• Conducting technical research and development across all aspects of development / design / application / integration of HRB fire safety, structural and building life safety systems • Developing systems and processes for the design / application / integration of HRB fire safety, structural and building life safety systems and considering new or evolving technology • Conducting complex and / or non-standard technical analyses on the development / design / application / integration of HRB fire safety, structural and building life safety systems • Developing solutions involving complex or multidisciplinary technology in relation to HRB fire safety, structural and building life safety systems • Developing and evaluating continuous improvement systems on HRB fire safety, structural and building life safety systems, including any related life critical sub-systems	Wherever relevant, applicants shall demonstrate the ability to: • Identify the building regulations and appropriate fire safety standards and recognised guidance in respect of life safety systems • Identify system boundaries and interfaces with other life safety and all building systems. Develop, specify and construct appropriate control and monitoring strategy to ensure the operation and function of the system • Assess and select suitable use of passive fire protection and how they may be impacted by the installation of services within the building. Select appropriate passive protection methods / systems to maintain fire integrity of the building • Consider the resilience of all Building Services water, electrical, VT and smoke and ventilation systems for firefighting purposes and assess potential risks to loss of supply and develop a strategy to ensure that critical life safety systems are protected with secondary systems where appropriate • Establish the levels of risk and develop cause and effect solutions for all multidisciplinary systems covering rated fire safety and evacuation systems • Consider and develop a strategy for the testing and commissioning of the life safety systems both individually and also as an integrated system to demonstrate function and operation in respect of the design intent eg Black building test • Identify the operation and understand the correct function of the life safety systems be able to demonstrate regular performance tests and housekeeping to ensure the systems continue to meet the fire safety strategy and systems design intent

Competence		Scope	
BB. Design, development and solving engineering problems **Chartered Engineers shall apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.** This competence is about the ability to apply engineering knowledge effectively and efficiently to the individual tasks which need to be undertaken in the applicant's role in relation to HRBs.	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 1.Take an active role in the identification and definition of project requirements, problems, and opportunities throughout the building life cycle of HRBs.	Construction legislation relevant to higher-risk buildings (HRBs) including: **Construction Legislation** • The Building Act 1984 • The Building Safety Act 2022 and Regulations • Building regulations • Approved documents • Approved Document 7: Materials and Workmanship • Building regulations (procedural) • Local acts / enactments • Government communications / circular letters • Sustainable and Secure Buildings Act 2004 • Regulatory Reform (Fire Safety) Order 2005 • Construction (Design and Management) Regulations 2007 • Management of Health and Safety at Work Regulations • Health and Safety at Work Act 1974 • Gas Safety (Installation and Use) Regulations 1998 • Relevant case law • Contract law **Related Guidance** Authoritative guidance as typically published by institutions, industry bodies and individuals including Collaborative Reporting for Safer Structures UK (CROSS-UK). • Royal Institute of British Architects (RIBA) plan of work • Building Services Research and Information Association (BSRIA) plan of work • Civil, criminal, and case law • Contract law • Law of agency • Employment law • The Housing Acts 1985,1988, 1996, 2004 • Housing Health and Safety Rating System • Equalities Act 2010 • Town and Country Planning Act 1990 • Housing and Regeneration Act 2008 • Licensing legislation	

Examples of evidence	HRB specific criteria
• Identifying projects (or technical improvements to products, processes, or systems needed to undertake an engineering task within the development / design / application / integration) in regard to HRB fire safety, structural and building life safety systems. • Preparing specifications on the development / design / application / integration of HRB fire safety, structural and building life safety systems, and taking account of functional and other requirements. • Establishing user requirements for improvements in HRB fire safety, structural and building life safety systems. • Reviewing specifications and tenders to identify technical issues and potential improvements, with specific focus on elements concerning the development / design / application / integration of HRB fire safety, structural and building life safety systems. These reviews must also consider, contribute, and innovate towards the continuation of the golden thread of information. • Conducting technical risk analysis on HRB fire safety, structural and building life safety systems, and identifying mitigation measures. • Considering and implementing new and emerging technologies within the development / design / application / integration of HRB fire safety, structural and building life safety systems	Wherever relevant, applicants shall demonstrate the ability to: • Understand, respect and appreciate the contribution and roles of all disciplines forming part of the design, construction and operation teams eg Architect, Structural, Fire Engineers, Specialists, Contractors, Manufacturers, Facilities Managers / Engineers • Identify project or technical requirements and improvements to products, processes, or systems appropriate to the building's fire safety and evacuation systems including all life critical sub-systems • Demonstrate leadership and contribute to the co-ordinated design and development of engineering solutions suitable to ensure safety in construction, use, maintenance and demolition • Develop, implement and evaluate appropriate techniques, systems, procedures and methods to undertake the engineering design, construction and operation co-ordinating at all times with other members of the design, construction and facilities management teams • Identify and establish interfaces with static and dynamic life safety systems and co-ordinate the outcomes with other team members to ensure the building and systems are fully compatible and function to the required performance • Consider repair, de-construction, dismantling and recycling of products, materials and systems. Implementing measures within the procurement, design and construction to provide for future de-construction of the building and systems • Prepare specifications and define operational requirements appropriate to the building's normal and fire safety, ventilation and evacuation systems including all life critical sub-systems • Review specifications, tenders and contractor proposals to identify technical issues, emerging technologies and potential improvements. The review must consider, contribute and innovate towards the continuation of the golden thread of information appropriate to the building's fire safety and evacuation systems including all life critical sub-systems • Implement suitable testing and commissioning of the life safety systems individually and as an integrated system to demonstrate function and operation in respect of the design intent eg Black building test

Competence		Scope
BB. Design, development and solving engineering problems		

Examples of evidence	HRB specific criteria
	• Identify the operation and understand the correct function of the life safety systems and undertake regular performance tests to demonstrate the systems continue to meet the fire safety strategy and systems design intent for the HRB • Maintain the Golden Thread by ensuring all appropriate of information with importance on fire safety and means of escape including performance and interfaces of life safety systems, the engineering services and building fabric are fully documented and issued to the appropriate parties throughout the life cycle of HRBs

Competence		Scope
BB. Design, development and solving engineering problems	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 2. Undertake research, analysis and development to define, refine and apply relevant standards, testing, assessment, site inspection and maintenance procedures for building materials, products, components, assemblies and systems effectively throughout the building life cycle.	• British and international product standards • Testing standards, procedures, and interpretation of results • Good practice specification • Product characteristics and performance • System, component or assembly testing and performance • Prototyping / sample panel and testing • Maintenance requirements • Maintenance testing and commissioning of building systems and services

Examples of evidence	HRB specific criteria
• Identifying and agreeing appropriate research methodologies on the development / design / application / integration of HRB fire safety, structural and building life safety systems • Investigating a technical issue within the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then identifying potential solutions, and determining the factors needed to compare them • Identifying and conducting physical tests or trials on HRB fire safety, structural and building life safety systems • Conducting technical simulations or analysis with regards to the development / design / application / integration of HRB fire safety, structural and building life safety systems • Preparing, presenting, and agreeing design recommendations, with appropriate analysis of risk on the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then taking account of, quality, safety, reliability, accessibility, appearance, fitness for purpose, cost, security (including cyber security), intellectual property constraints and opportunities, as well as environmental impact	Wherever relevant, applicants shall demonstrate the ability to: • Research agree appropriate research methodologies, fully understand and assess the appropriateness of the specification and selection of appropriate materials and products standards as far as they relate to your particular expertise and appreciate those standards, materials and products that have an interface with the design, construction and operational requirements for the building's life safety systems • Consider and implement new and emerging technologies appropriate to fire safety and evacuation systems including all life critical sub-systems. Be up to date with the current and emerging legislation around HRBs • Assess and be satisfied the appropriateness of the selected products, components, assemblies and systems including identifying and conducting physical tests or trials to ensure that the building and its life safety systems operate and perform safely throughout its life cycle • Conduct technical simulations or analysis with regards to the development, design, application and integration of fire safety and evacuation systems, including any related life critical sub-systems • Prepare, present, and agree design recommendations with appropriate analysis considering, quality, safety, reliability, accessibility, appearance, fitness for purpose, cost, security (including cyber security), intellectual property constraints and opportunities, and environmental impact • Ensure that the design, specification and construction of the life safety systems has taken into account of quality, safety, reliability, accessibility, appearance, fitness for purpose, cost, security (including cyber security), intellectual property constraints. The environmental impact should respect the methods and requirements for ongoing regular maintenance throughout the life of the building to ensure the correct function of the systems and that they are operational at all times are considered

Competence		Scope
BB. Design, development and solving engineering problems	To the extent that it is relevant to their role, the applicant shall demonstrate that they: 3. Can implement engineering tasks and evaluate the effectiveness of engineering solutions.	• Engineering solutions applicable across the building life cycle of HRBs

Examples of evidence	HRB specific criteria
• Ensuring that the application of the design within HRB fire safety, structural and building life safety systems, results in the appropriate practical outcome • Implementing design solutions and taking account of critical constraints. This includes due concern for safety, sustainability, and disposal or decommissioning, within HRB fire safety, structural and building life safety systems • Identifying and implementing lessons learned • Evaluating existing designs or processes within the development / design / application / integration of HRB fire safety, structural and building life safety systems. Then identifying faults or potential improvements including risk and life cycle considerations • Actively learning from feedback to improve future design solutions and establish best practice within the development / design / application / integration of HRB fire safety, structural and building life safety systems.	Wherever relevant, applicants shall demonstrate the ability to: • Ensure the application of the design is inclusive of all products, components and systems to implement the fire safety strategy and safety in design, construction and operation for the building • Identify the constraints of the building, develop and implement fire safety design solutions that consider safety and wellbeing of occupants, sustainability, resilience and future proof in operation, decommissioning and disposal • Evaluate existing building systems and installation within the designs or processes during construction, commissioning and operation. Make corrective actions and implement lessons learnt, propose alternative solutions within the development of design, application and integration of fire safety and evacuation systems, including any related life critical sub-systems • Actively learn from reviews and or audits in operation including feedback from the operators and occupants of the building on its processes and systems. Implement and integrate corrective measures and or development of future design solutions to improve and build on best practice within the development, design for the application and integration of fire safety and evacuation systems, including any related life critical sub-systems

Glossary

BSI 8670	Relates to 'Built environment – Core criteria for building safety in competence frameworks – Code of practice' See: www.bsigroup.com
Building Safety Act 2022 (BSA)	Gives **residents** and **homeowners** more rights, powers, and protections resulting in safer homes. It overhauls existing regulations and makes clear how residential buildings should be constructed, maintained, and made safe. See: www.legislation.gov.uk
Building life cycle	This includes selecting appropriate techniques, procedures and methods to design, construct, commission, operate, maintain, refurbish / repurpose, decommission, demolish and recycle. These can apply to building engineering processes, systems, services and products. This ensures compliance with relevant legislation, regulations, statutory guidance and standards of performance applicable to HRBs.
Building Safety Regulator (BSR)	They oversee the safety and standards of all buildings, helping and encouraging the built environment industry and building control professionals to improve their competence. Leading implementation of the new regulatory framework for high-rise buildings. See: www.hse.gov.uk/building-safety/regulator.htm
CROSS	Collaborative Reporting for Safer Structures UK (CROSS-UK) is a confidential reporting system which allows professionals working in the built environment to report on fire and structural safety issues. These are published anonymously to share lessons learned, create positive change, and improve safety.
Higher-risk building (HRB)	For a building to qualify as a higher-risk building it will meet either the height (18 metres or higher) or storeys (seven storeys or more) threshold, and will contain at least two residential units, or be a care home or hospital, as specified in the regulations set out at: www.legislation.gov.uk
Joint Competent Authority (JCA)	Consists of local authority building standards, fire and rescue authorities, and the Health and Safety Executive. Proposed by Dame Judith Hackitt in her review of building regulations and fire safety.
Occupant	An individual who occupies a house, office, vehicle on a regular basis. The occupant does not extend to living in or use the space as their own.
Owner/ homeowner	The legal owner or leaseholder of a property or individual dwelling.
UK-SPEC HRB	The UK Standard for Professional Engineering Competence and Commitment Contextualised for Higher-Risk Buildings UK-SPEC HRB. The document sets out the competence and commitment requirements for registration as an EngTech, IEng or CEng. UK-SPEC HRB is one of the Standards the Engineering Council publishes, along with UK-SPEC, AAQA, AHEP, and the ICTTech Standard.