EEM01

Assess the age, nature and characteristics of older and traditional buildings

Overview

This standard is about assessing the age, nature and characteristics of older and traditional buildings.

It sets out the skills, knowledge and understanding for you to assess their heritage values and significance, construction, condition, and heating and ventilation performance, and the implications of these for the introduction of energy efficiency measures.

This standard is suitable for those working in the retrofit sector with responsibility for assessing older and traditional buildings for the installation of energy efficiency measures.

Performance criteria

You must be able to:

P1. establish the age of buildings and the implications for the introduction of energy efficiency measures

P2. assess the heritage values and significance of older and traditional buildings

P3. apply conservation principles to older and traditional buildings

P4. assess the construction of older and traditional buildings, their performance and the materials used

P5. assess the types of heating and ventilation systems in older and traditional buildings and the implications these have on the introduction of energy efficiency measures

P6. identify common building issues and defects, and assess their implications for energy efficiency measures

P7. assess when further analysis or investigation is required and refer to a specialist

Knowledge and understanding

You need to know and understand:

P1 BUILDING AGE AND IMPLICATIONS

K1. sources of information to help establish the age of older and traditional buildings including:

1. the building
2. owner/occupier
3. building plans and documents
4. historic maps
5. historic environment records and listed building records
6. conservation area appraisals

K2. the architectural styles and characteristics of buildings from the following periods:

1. Medieval
2. Pre-Georgian
3. Georgian
4. Victorian
5. Edwardian

K3. how U-values for building elements can be calculated and why the age building parts may impact on the default U-values used in core energy modelling methodologies

K4. the relevance of building age in relation to the difference in performance characteristics between traditional and modern materials and construction methods

P2 HERITAGE VALUES AND SIGNIFICANCE

K5. how the following heritage values are used to assess and describe the significance of buildings:

1. evidential
2. historical
3. aesthetic
4. communal

K6. why and how statements of significance and heritage impact assessments are prepared and used

K7. the range of current legislation and sources of official guidance relevant to built

heritage relating to:

1. listed buildings
2. scheduled monuments
3. conservation areas and tree preservation orders
4. directions withdrawing permitted development rights
5. exemptions relating to ecclesiastical buildings
6. local listing

K8. the necessity and context of applying a whole building approach

K9. the key factors to consider when taking a whole building approach to the installation of energy efficiency measures including:

1. occupant or owner requirements, behaviours and well-being, financial and human resources
2. local context, including location, orientation, elevation, exposure, access, planning and site constraints
3. exposure to existing and future natural hazards, including extreme weather events, wind driven rain, flooding and overheating
4. exposure to harmful materials such as asbestos and radon
5. the increased risk and cost of unintended consequences
6. building use and occupancy patterns
7. building fabric and potential reactions between materials
8. building condition and hygrothermal performance
9. impacts of moisture, humidity and water
10. heritage values and significance
11. building services, including user understanding of controls
12. existing energy efficiency measures and climate change adaptations
13. local options for heat and energy supply
14. wider context and opportunities for enhancements including environmental, cultural, community and economic

K10. reasons for taking a whole building approach to the installation of energy efficiency measures including ensuring that measures are:

1. building specific – no ‘one size fits all’ approach
2. suitable and proportionate
3. planned and phased
4. well-integrated, properly coordinated and installed in the right sequence

5. effective and sustainable
6. specified once uncertainties are highlighted and resolved
7. designed to manage the risks of unintended consequences

P3 APPLY CONSERVATION PRINCIPLES

K11. the following principles of conservation:

1. authenticity
2. integrity
3. maintenance
4. like-for-like repair
5. minimum intervention
6. restoration
7. re-treatability
8. reversibility

K12. how the principles of conservation are applied to older and traditional buildings in relation to the introduction of energy efficiency measures

P4 CONSTRUCTION AND MATERIALS

K13. the types of construction of older and traditional buildings, the materials used and how they differ from modern construction and materials

K14. how to identify local and regional variations of traditional buildings and materials

K15. how the performance of traditionally constructed buildings differs to modern construction particularly in relation to:

1. thermal mass
2. moisture transport mechanisms: diffusion, convection, capillary suction and gravity, and how these affect hygrothermal performance
3. relevant material properties such as hygroscopicity and vapour permeability
4. ability of materials to buffer moisture and temperature
5. condensation and dewpoint
6. vapour pressure
7. absolute and relative humidity
8. ventilation and air movement

K16. the effect of the geographical location, climate, aspect, orientation and the differing exposure of individual elevations on the way older and traditional buildings

perform

K17. the interaction of traditional and modern materials and the consequences of using incompatible and poorly designed energy efficiency measures with particular reference to:

1. thermal mass
2. thermal bridging
3. moisture movement
4. air tightness of the fabric
5. ventilation and air movement
6. indoor air quality (IAQ) and indoor environmental quality (IEQ)
7. climate change and the ability of buildings and their occupants to manage natural hazards including extreme weather events, wind driven rain, flooding, and overheating
8. heritage value and significance

P5 HEATING AND VENTILATION

K18. the types and condition of water and space heating systems and the implications these have on the introduction of energy efficiency measures including:

1. hard water and soft water impacts
2. gas heating systems
3. oil systems
4. micro-renewable systems
5. electric systems
6. solid fuel
7. hybrid systems
8. combined heat and power (CHP)
9. district heating systems

K19. the types and condition of controlled ventilation and the implications these have on the introduction of energy efficiency measures including:

1. background and trickle vents
2. centralised and decentralised mechanical extract ventilation (MEV) and mechanical ventilation with heat recovery (MVHR)
3. passive stack ventilation
4. permanent openings and ventilation grilles
5. purge ventilation

6. positive input ventilation

K20. the sources of uncontrolled air infiltration and the implications these have on the introduction of energy efficiency measures

K21. the way of establishing and measuring the level of airtightness of older or traditional buildings including smoke tests, blower door tests and infrared thermography

P6 BUILDING DEFECTS

K22. how to identify the common building issues and defects, and their causes including:

1. moisture, including driving rain, rising and penetrating damp, internal moisture vapour, inadequate or damaged drainage systems, elevated external ground levels
2. effect of moisture on the thermal resistance of building fabric, particularly external walls
3. time needed to allow for walls to dry out after repairs
4. inadequate or defective ventilation
5. structural defects and structural movement
6. condition of exterior building fabric
7. defects with existing energy efficiency measures
8. cavity wall issues, including early cavity walls, blocked cavities, wall-tie failure, hard to treat cavities
9. asbestos, radon and other harmful materials
10. alterations or extensions to the building, its materials or finishes

K23. the implications of common building issues and defects for the introduction of energy efficiency measures

K24. how building materials degrade and deteriorate over time with particular reference to:

1. inherent material defects
2. physical processes, including shrinkage, expansion, erosion
3. chemical processes, including corrosion, salt crystallisation
4. fungal attack and insect infestation
5. excess loading

K25. how alterations to the original construction affect the performance of buildings

with particular reference to thermal performance, hygrothermal performance, overheating and thermal comfort

P7. SPECIALIST ANALYSIS OR INVESTIGATION

K26. when there is insufficient knowledge or evidence present to make recommendations on the introduction of energy efficiency measures to older or traditional buildings

K27. the range of specialists that may be needed when considering the introduction of energy efficiency measures to older and traditional buildings including:

1. fire consultant
2. heritage consultant
3. local authority planning or built heritage conservation officer
4. building surveyor
5. structural engineer
6. independent damp and timber consultant
7. building services consultant
8. conservator
9. archaeologist
10. ecologist

K28. the types of further analysis and investigation available including:

1. fire assessment
2. assessment of significance and heritage impact assessment
3. building condition survey
4. keyhole investigation
5. opening up
6. testing, monitoring and remote sensing, including airtightness testing, infrared thermography and in situ U-value monitoring
7. moisture management evaluation
8. moisture risk assessment
9. building services assessment
10. archaeological investigation
11. ecological assessment
12. overheating assessment

K29. when and how to refer to specialists

Glossary

Heritage Impact Assessment
A structured process to make sure that the significance of the historic building is taken into account when developing and designing proposals for change. It is a core part of the design process, which tests whether the proposed changes are appropriate by assessing their impact on the building's significance.

Significance
The sum of the four component cultural heritage values (evidential, historical, aesthetic and communal), often set out in a Statement of Significance.

Traditional construction
Building with solid brick, stone or earth external walls, constructed with moisture-permeable materials and usually built prior to 1919, or pre-1919 timber-frame external walls with any infill.

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