



MCS Company Scheme Criteria for:

# Full Scope Designer Criteria

DRAFT Consultation Document

This document shows the Competence Criteria required to be met by a company undertaking the type of work detailed above.



These competencies have been identified from the current Qualifications Credit Units (QCF) devolved from the National Occupational Standards (NOS) to cover the Full Scope Design Activity

Anybody holding:

1. **The criteria shown is taken in part from a very high level degree course on complex design in the building service.**

Following the consultation and agreed criteria, it shall be available for either

1. Mapping against existing qualifications
2. Short course qualifications
3. An Experienced Workers Route

The expectation is that companies wishing to directly meet this criteria once agreed, will for a transitional time period be able to “Self-Declare” how they meet with the criteria for this scope.

An Experienced Workers Route (EWR) will cover all the competencies outlined if taken in support of a EWR covering the same detail as titled on this document.

A full list of Qualifications that have been deemed to have met this criteria can be found at <http://www.microgenerationcertification.org/> along with access to EWR providers.

**Please note** anybody who has achieved the assessment without holding the correct mandatory Pre-requisites are likely to have to demonstrate further compliance against this company criteria.

### Criteria Presentation

The criteria shown below in the following tables has been purposely presented in one of five categories:

1. Health and Safety – HS
2. Technical Skills – TS
3. Soft Skills – SS
4. Other – OT
5. Additional Information - AD

Where any box is blank these are intentionally blank.

By presenting the criteria within this format, it allows evidence to be collated for the Experienced Workers Route (EWR) options of evidencing compliance with the criteria.



Health and Safety Skills			
No.	Objective	No.	Criteria
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Technical Skills			
No.	Objective	No.	Criteria
1	Be able to produce a project proposal relevant to a sector	1	Formulate realistic aims and objectives for the project
		2	Undertake an initial critical review of key information sources for the project
		3	Critically analyse initial findings to inform the viability and structure of the project
		4	Present a clear justification of the methodology for the project
2	Be able to plan and manage the project	1	Develop a realistic strategy for undertaking the project
		2	Specify the resource implications for completion of the project
		3	Develop a detailed schedule for the proposed project
3	Be able to implement the project to address identified requirements	1	Undertake a coherent critical review of the key body of knowledge relevant to the project requirements
		2	Collect and collate primary data relevant to the project requirements
		3	Use established techniques to address the project requirements
		4	Analyse the benefits and limitations of the project findings
5	Be able to present the project outcomes	1	Present the project outcomes coherently in an agreed format
6	Understand the function of building services design	1	Appraise the services needs of a client
		2	Evaluate the role of the building services consultant at design work stages
		3	Critically analyse the buildability of design solutions which satisfy an agreed design concept
		4	Critically evaluate specialist product information based on a sustainable whole-life design strategy
7	Be able to produce sustainable building services design solutions	1	Prepare the concept design deliverables from a client's brief
		2	Devise design deliverables for the construction phase
		3	Produce detailed design proposals for a specific building services function
8	Be able to integrate building services design solutions throughout the lifetime of a building	1	Critically evaluate the post-practical completion stage of a specific building project
		2	Integrate building services design to the facilities management within an operational building



9	Be able to appraise the environmental drivers for innovation in sustainable construction	1	Critically analyse the impact of environmental drivers on the construction sector
		2	Appraise how a specific environmental driver leads to innovation for sustainable construction
		3	Critically review a project proposal in terms of innovation and sustainability
10	Understand the use of innovative materials, components and systems for sustainable construction	1	Examine the specification of innovative materials used in sustainable construction
		2	Devise a specification for a project that promotes innovation and sustainability
		3	Evaluate the long-term implications of using innovative materials, components and systems in a project
11	Be able to develop innovative proposals using appropriate modelling techniques	1	Evaluate the limitations of a parametric model for a specific design proposal
		2	Develop an innovative proposal to a design brief using modelling techniques
12	Understand influences on the management of the natural and built environments	1	Evaluate the influence of agencies on the management of the natural and built environments
		2	Critically analyse the relationship between environmental priorities and commercial goals for a project
13	Be able to measure the environmental impact of a building development, using appropriate techniques	1	Evaluate the performance of a building in relation to environmental parameters
		2	Evaluate the immediate impact of a building within its context
		3	Assess the environmental impact of a building over its lifecycle within its context
		4	Develop a proposal which minimises the environmental impact of a proposed building project within its context
14	Understand the impact of environmental issues on the construction sector	1	Evaluate the impact of climate change on the operational aspects of buildings
		2	Evaluate current carbon reduction strategies within the construction sector
		3	Analyse the impact of carbon reduction strategies on the operational aspects of buildings
15	Be able to evaluate construction processes	1	Evaluate the construction processes against client's needs for a given project
16	Be able to analyse and model engineering situations and solve problems using number systems	1	Use estimation techniques and error arithmetic to establish realistic results from experiment
		2	Convert number systems from one base to another, and apply the binary number system to logic circuits
		3	Perform arithmetic operations using complex numbers in cartesian and polar form
		4	Determine the powers and roots of complex numbers using de moivre's theorem
		5	Apply complex number theory to the solution of engineering problems when appropriate



17	Be able to analyse and model engineering situations and solve problems using graphical and numerical methods	1	Draw graphs involving algebraic, trigonometric and logarithmic data from a variety of scientific and engineering sources, and determine realistic estimates for variables using graphical estimation techniques
		2	Make estimates and determine engineering parameters from graphs, diagrams, charts and data tables
		3	Determine the numerical integral of scientific and engineering functions
		4	Estimate values for scientific and engineering functions using iterative techniques
18	Be able to analyse and model engineering situations and solve problems using vector geometry and matrix methods	1	Represent force systems, motion parameters and waveforms as vectors and determine required engineering parameters using analytical and graphical methods
		2	Represent linear vector equations in matrix form and solve the system of linear equations using gaussian elimination
		3	Use vector geometry to model and solve appropriate engineering problems
19	Be able to analyse and model engineering situations and solve problems using ordinary differential equations	1	Analyse engineering problems and formulate mathematical models using first order differential equations
		2	Solve first order differential equations using analytical and numerical methods
		3	Analyse engineering problems and formulate mathematical models using second order differential equations
		4	Solve second order homogeneous and non-homogenous differential equations
		5	Apply first and second order differential equations to the solution of engineering situations
20	Be able to analyse and model engineering situations and solve engineering problems using series and numerical methods for the solution of ordinary differential equations	1	Determine power series values for common scientific and engineering functions
		2	Solve ordinary differential equations using power series methods
		3	Solve ordinary differential equations using numerical methods
		4	Model engineering situations, formulate differential equations and determine solutions to these equations using power series and numerical methods
21	Be able to analyse and model engineering situations and solve engineering problems using Laplace transforms	1	Determine laplace transforms and their inverse using tables and partial fractions
		2	Solve first and second order differential equations using laplace transforms
		3	Model and analyse engineering systems and determine system behaviour using laplace transforms
22	Be able to analyse and model engineering situations and solve engineering	1	Determine fourier coefficients and represent periodic functions as infinite series
		2	Apply the fourier series approach to the exponential form and model phasor behaviour



	problems using Fourier series	3	Apply fourier series to the analysis of engineering problems
		4	Use numerical integration methods to determine fourier coefficients from tabulated data and solve engineering problems using numerical harmonic analysis
23	Be able to analyse and model engineering situations and solve engineering problems using partial differential equations	1	Solve rates of change problems and problems involving stationary values using partial differentiation
		2	Solve partial differential equations using direct partial integration and separation of variables methods
		3	Model and analyse engineering situations using partial differential equations
24	Understand the application of processes involved in the design of complex construction projects	1	Evaluate the effectiveness of design processes from conception to handover for a specified project brief
		2	Critically evaluate procurement arrangements for a specified project brief
25	Be able to produce sustainable concept solutions	1	Analyse specific design issues presented by the project brief
		2	Justify proposed structural form and finishes
		3	Produce a sustainable concept solution to meet the requirements of the brief
26	Be able to produce sustainable building services design solutions	1	Prepare the concept design deliverables from a client's brief
		2	Devise design deliverables for the construction phase
		3	Produce detailed design proposals for a specific building services function
27	Be able to integrate building services design solutions throughout the lifetime of a building	1	Critically evaluate the post-practical completion stage of a specific building project
		2	Integrate building services design to the facilities management within an operational building
28	Understand the environmental impact of design solutions	1	Evaluate the specified design solution in terms of buildability, sustainability and client requirements
		2	Justify design solution against environmental protocols
29	Understand the application of project assessment techniques within the construction phase	1	Evaluate social cost benefit analysis for public and private construction projects
		2	Compare the cost effectiveness of project assessments currently used in the construction industry
30	Be able to create a project management plan to meet commercial, health and safety, stakeholder and environmental requirements	1	Appraise a specific construction project in terms of project requirements
		2	Produce a construction project management plan to meet success criteria for a specific construction project
31	Be able to apply modelling techniques in managing complex construction projects	1	Compare current building simulation techniques that can be applied to a specific construction project
32		1	Interpret planning regulations to produce a compliant solution for a sustainable development



	Be able to devise compliant strategies for sustainable developments	2	Determine the technical criteria to achieve a compliant solution for a sustainable development
		3	Devise a specific sustainable development proposal based on a design concept
33	Be able to model best-fit solutions for sustainable assets and their legacy characteristics	1	Create a compliant building design simulated by changing building attributes
		2	Appraise design solutions for best-fit compliance standards
		3	Develop a model best-fit solution for a development opportunity which demonstrates a positive capability for addressing longer term legacy issues
34	Understand the process of transformation from electrical and electronic designs to functional electrical services installations	1	Evaluate the production processes based on a building service design concept
		2	Prepare detailed drawings and installation documentation for the installation team
		3	Devise the method statements based on project information
35	Understand production techniques for electrical services installations	1	Evaluate the technical impact of production techniques based on layout drawings
		2	Evaluate the environmental impact of the production technique for a specific design proposal
		3	Prepare the production methods statements for an electrical installation project
		4	Produce the project installation programme for the electrical and electronic services based on the contractor's programme of work
36	Be able to produce documentation for the installation and commissioning of electrical services	1	Produce the production documentation for a specific design proposal
		2	Develop test procedures and measurable parameters for a specific building services installation
		3	Produce a commissioning plan based on a design concept
		4	Evaluate environmental factors based on the production and commissioning documentation for a project
		5	Critically evaluate the maintenance requirements for an electrical installation
		6	Evaluate operation and control strategies to ensure sustainable in use operation for a specific services project
37	Be able to optimise the operating efficiency of electrical services installations	1	Compare individual service energy performance data and operational ratings for a specific electrical services installation
		2	Critically evaluate the environmental performance of an operating electrical services installation
		3	Devise strategies for monitoring and control of the electrical services installation
38	Understand the process of transformation from	1	Evaluate the production processes based on a building service design concept



	mechanical designs to functional mechanical services installations	2	Prepare detailed drawings and installation documentation for the installation team
		3	Devise the method statements based on project information
39	Understand production techniques for mechanical services installations	1	Evaluate the technical impact of production techniques based on layout proposal
		2	Evaluate the environmental impact of the production technique for a specific design proposal
		3	Prepare the production methods statements for a mechanical installation project
		4	Produce the project installation programme for the mechanical services based on the project programme of work
40	Be able to produce documentation for the installation and commissioning of mechanical services	1	Produce the production documentation for a specific design proposal
		2	Develop test procedures and measurable parameters for a specific building services installation
		3	Produce a commissioning plan based on a design concept
		4	Critically evaluate the maintenance requirements for a mechanical installation
		5	Evaluate operation and control strategies to ensure sustainable in use operation for a specific services project
41	Be able to optimise the operating efficiency of mechanical services installations	1	Compare individual service energy performance data and operational ratings for a specific mechanical services installation
		2	Critically evaluate the environmental performance of an operating mechanical services installation
		3	Devise strategies for monitoring and control of the mechanical installation
42	Understand the production and construction techniques associated with innovative technologies	1	Discuss the innovative technologies used to monitor energy use in a building
		2	Critically evaluate production techniques used to construct a code 6 dwelling
		3	Critically evaluate health and safety requirements to construct a code 6 dwelling
		4	Critically evaluate applications of innovative components and systems used in a building service of a commercial development
43	Understand how innovation and sustainability may affect the life cycle of a construction project	1	Evaluate the effect on a project life cycle of a given set of environmental challenges
		2	Critically examine the application of innovation to a given project brief
44	Be able to determine the performance of buildings	1	Analyse the buildability of a given building structure
		2	Assess the adaptability and flexibility of a given building structure
		3	Critically evaluate the end-of-use performance of a given building structure





45	Be able to determine the energy efficiency performance of the building services systems	1	Critically examine the energy efficiency issues for a given building services design
		2	Assess the performance of a given building services design
46	Understand the application of processes involved in the design of complex construction projects	1	Evaluate the effectiveness of design processes from conception to handover for a specified project brief
47	Be able to produce sustainable concept solutions	1	Analyse specific design issues presented by the project brief
		2	Justify proposed structural form and finishes
		3	Assess the potential sustainability of the concept solution
		4	Produce a sustainable concept solution to meet the requirements of the brief
48	Be able to produce sustainable design solutions	1	Develop a safe and sustainable design solution for a specified project brief
		2	Evaluate the buildability of the final design solution

Soft Skills			
No.	Objective	No.	Criteria
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Other			
No.	Objective	No.	Criteria
Intentionally Blank			

Additional Guidance			
Intentionally Blank			