



MCS Company Scheme Criteria for:

# Wind Turbine Non - Building Mounted Nominated Technical Persons 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 range of work a Nominated Technical Person (NTP) working in the scope identified on the front page would normally undertake.

Anybody holding:

1. An approved Wind Assessment Certificate

Is likely to have met with all of the criteria presented within this document.

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.



<b>Health and Safety Skills</b>			
<b>No.</b>	<b>Objective</b>	<b>No.</b>	<b>Criteria</b>
1	Know the health and safety risks and safe systems of work associated with micro wind system installation work	1	Confirm the aspects of micro wind systems installation work which pose a risk in relation to:
		2	Working at height
		3	Electrocution (overhead cables)
		4	Electrocution (installed electrical systems)
		5	Buried utility services
		6	Injury during manual handling
		7	Injury due to working with batteries
		8	Effect of installed systems on the safe operation of fuel burning equipment
26	Construction Site Managers to give them the knowledge to be able to manage legislative requirements for health, safety and welfare practice within a construction site.	1	Clarify the client's obligations under the current cdm legislation.

<b>Technical Skills</b>			
<b>No.</b>	<b>Objective</b>	<b>No.</b>	<b>Criteria</b>
2	Know the requirements of the relevant regulations/standards relating to practical installation, testing and commissioning activities for micro wind systems installation work	1	Interpret building regulation/building standards guidance as relevant to micro wind systems installation work in relation to:
		2	Maintaining the structural integrity of the building
		3	Conservation of fuel and power
		4	Electrical installations in dwellings
		5	Notification of works
		6	Planning permission requirements
		7	Potential noise and flicker assessment considerations
		8	Interpret industry recognised electrical wiring regulation requirements as relevant to micro wind system installation work in relation to:
		9	System installation
		10	Inspection and testing
		11	Commissioning
		12	DNO notification requirements
3	Know the fundamental differences between a.c and d.c circuits within micro wind systems	1	Confirm the effects of wild a.c. currents and the reason the use of rectifiers is necessary
		2	Confirm the differences between a.c. and d.c. theory in terms of
		3	Voltages



		4	Safe isolation
		5	Selection of appropriate system components
4	Know the purpose and function of micro wind system components	1	Confirm the purpose of the following micro wind turbine components:
		2	Anemometer
		3	Blades
		4	Brake
		5	Controller
		6	Gearbox
		7	Generator
		8	High speed shaft
		9	Low speed shaft
		10	Nacelle
		11	Hub
		12	Wind vane
		13	Yaw drive
		14	Yaw motor
5	Know the types, and operating principles of different micro wind system turbines	1	Identify the following types of micro wind system turbine:
		2	Horizontal axis wind turbines (hawt)
		3	Lift - based vertical axis wind turbines (lift vawt)
		4	Drag - based vertical axis wind turbines (drag vawt)
		5	Confirm the operating principles and characteristics (including fish friendliness) of the following micro wind system turbines:
		6	Horizontal axis wind turbines (hawt)
		7	Lift - based vertical axis wind turbines (lift vawt)
		8	Drag - based vertical axis wind turbines (drag vawt)
		9	Compare the relative efficiencies of the following types of micro wind system turbines:
		10	Horizontal axis wind turbines (hawt)
		11	Lift - based vertical axis wind turbines (lift vawt)
		12	Drag - based vertical axis wind turbines (drag vawt)
6	Know the electrical connection system types, components and layouts for micro wind systems	1	Confirm the basic operating principles for direct connected a.c. (off grid) micro wind systems
		2	Confirm the basic operating principles for battery connected micro wind systems
		3	Confirm the operating principles and typical component layout arrangements for distribution network (grid) connect (inverter connected) systems, including requirements for:
		4	System components
		5	Types of component
		6	Component rating requirements
		7	Component positioning requirements



		8	System layout (including arrangements for connecting in parallel with the mains supply)
		9	Requirements for labelling/signage
7	Know the requirements for installing, fixing and mounting micro wind turbines	1	State the cable sizing requirements for micro wind turbines in relation to:
		2	V(max) and I (max)
		3	Maximum voltage drop at the rated output power of the turbine
		4	Cable rating requirements in relation to environmental factors
		5	Cable protection requirements
		6	Cable routes and lengths
		7	State the requirements for earthing micro wind towers in relation to situations where the:
		8	Turbine is in proximity to existing lightening protection
		9	Turbine is within an equipotential zone
		10	Identify the requirements for using the following micro wind turbine fixing and mounting arrangements:
		11	Building mounted systems
		12	Vertical wall mounted
		13	Roof mounted
		14	Mast types
		15	Tapered tubular columns
		16	Octagonal poles
		17	Multi- sided folded sheet steel monopole masts
		18	Lattice work masts
		19	Base hinged, tilt down masts
		20	Typical mast foundation requirements
		21	Pad foundations
		22	Typical sizing
		23	Protection against water pooling
		24	Fixings
		25	Types of fixings to prevent loosening
		26	Use of chemical fixings
		27	Guy supports
		28	Guy anchors
		29	Prevention of loosening of shackles and turnbuckles
8	Know the fundamental design principles used to determine the feasibility for the installation of micro wind systems	1	State the requirements for minimum wind speed and wind direction
		2	Identify different wind speed identification techniques including:
		3	Using anemometers
		4	UK wind speed database



		5	State the basic principles of wind power physics in terms of the relationship between		
		6	Wind power and wind speed		
		7	Wind power and the swept area of the turbine blades/rotor diameter		
		8	Confirm the typical relationship between turbine mounting height and turbine power output		
		9	State the meaning of the following terms as they relate to micro wind systems:		
		10	Rated power		
		11	Rated wind speed		
		12	Cut-in wind speed		
		13	Cut-out wind speed		
		14	Turbine flicker		
		15	State the effects that turbulence can have on micro wind turbine:		
		16	Performance		
		17	Condition/life		
		18	Identify factors that affect mean wind speed, including:		
		19	Turbines mounted on buildings		
		20	Turbines located in urban areas/adjacent to buildings		
		21	Application of mean wind speed scaling factors		
		22	Dense urban		
		23	Low rise urban /suburban		
		24	Rural		
		25	State the requirements for completing site surveys to assess the feasibility of micro wind systems, including:		
		26	Client requirements/preferences		
		27	Wind resource assessment (including preferred wind speed measurement period)		
		28	Mechanical installation site assessment		
		29	Electrical systems assessment		
		30	Planning considerations		
		31	Health and safety assessment		
		32	Survey record documentation		
		9	Know the preparatory work required for micro wind system installation work	1	Confirm micro wind preparatory work requirements in relation to:
				2	Authorisation for the work to proceed
				3	The availability of appropriate access to all required work areas
				4	The inspection and testing of existing electrical installations
		5	The proposed siting of key system components		



		6	The suitability of the building structure/site in relation to the proposed installation
		7	The suitability of the proposed location and position of the turbine for optimum power generation
10	Know the layouts and the requirements for installing micro wind systems	1	Recognise the following micro wind systems:
		2	Direct connected systems
		3	Distribution network (grid connected) systems
		4	Battery connected dc systems
		5	Confirm the requirements for handling, moving and storing micro wind system components
		6	Confirm the requirements for installing the following types of micro wind turbine:
		7	Horizontal axis wind turbines (hawt)
		8	Lift - based vertical axis wind turbines (lift vawt)
		9	Drag - based vertical axis wind turbines (drag vawt)
		10	Confirm the requirements for fixing and mounting micro wind installations including the use of:
		11	Building mounted systems
		12	Vertical wall mounted
		13	Roof mounted
		14	Mast types
		15	Tapered tubular columns
		16	Octagonal poles
		17	Multi - sided folded sheet steel monopole masts
		18	Lattice work masts
		19	Base hinged, tilt down masts
		20	Typical mast foundation requirements
		21	Pad foundations
		22	Typical sizing
		23	Protection against water pooling
		24	Fixings
		25	Types of fixings to prevent loosening
		26	Use of chemical fixings
		27	Guy supports
		28	Guy anchors
		29	Prevention of loosening of shackles and turnbuckles
		30	Confirm the requirements for siting and installing the following micro wind system components:
		31	Anemometer
		32	Blades
		33	Brake
		34	Controller



		35	Gearbox
		36	Generator
		37	High speed shaft
		38	Low speed shaft
		39	Nacelle
		40	Hub
		41	Wind vane
		42	Yaw drive
		43	Yaw motor
		44	Confirm how to check that voltages and currents are suitable for the:
		45	Inverter rating
		46	Overall system installation
		47	Confirm the requirements for cable routing within micro wind systems in relation to:
		48	Cable rating requirements in relation to environmental factors
		49	Cable protection requirements
		50	Propose the correct sequence of work to minimise the risk of injury through electrocution
11	Know the requirements to test and commission micro wind systems	1	Confirm the pre-commissioning procedures and/or requirements for testing a micro wind system in relation to:
		2	Turbine siting
		3	Turbine support and site work
		4	Turbine installation
		5	Turbine output cables
		6	Turbine isolator
		7	Turbine junction box
		8	Earthing and lightning protection
		9	Turbine metering
		10	Turbine controller
		11	Provision of labelling/signage
		12	Confirm the regulatory and industry pre-commissioning test requirements for distribution network (grid) connected micro wind systems:
		13	General design checks
		14	Battery specification checks
		15	Installation checks
		16	State the requirements for completing electrical installation tests relevant to micro wind systems
		17	State the requirements for completing performance tests on micro wind systems, including:
		18	Using an anemometer (at hub height)





		19	Using the system display meter
		20	Confirm the regulatory and industry requirements for the commissioning micro wind systems
		21	Confirm the regulatory and industry requirements for completing commissioning records for micro wind systems
		22	Confirm the regulatory and industry requirements for completing commissioning records for micro wind systems
12	Know the requirements to handover micro wind power systems	1	State the pre-handover checks that need to be carried out for micro wind systems
		2	Confirm the recommended industry handover procedures for micro wind systems in relation to:
		3	MIS 3003 requirements
		4	Requirement for customer to contact their electrical energy supplier
13	Know the requirements for the routine inspection, service and maintenance of micro wind systems	1	State which documentation needs to be available to enable a routine service and maintenance inspection
		2	Confirm the typical routine service and maintenance requirements in relation to:
		3	Visual inspection requirements
		4	Checking the condition of micro wind mounting arrangements
		5	Checking the condition of and cleaning of components
		6	Wind speed checks/tests
		7	Safe condition testing
		8	Functional testing
		9	Performance testing
		10	Adjustment of controls/components
		11	Confirm the recording and reporting requirements for routine maintenance work
14	Know how to diagnose faults in micro wind systems	1	State the information that needs to be available to enable fault diagnosis
		2	Confirm the work action and sequences required to diagnose the following faults:
		3	Poor turbine output
		4	Excessive turbine noise, vibration and temperature
		5	Excessive generator noise, vibration and temperature
		6	Control panel/display meter function problems
15	Know how to rectify faults in micro wind systems	1	Confirm the work action and sequences required to rectify the following faults:
		2	Poor turbine output
		3	Excessive turbine noise, vibration and temperature
		4	Excessive generator noise, vibration and temperature
		5	Control panel/display meter function problems



16	Plan and prepare for the installation of micro wind systems	1	Undertake micro wind preparatory work requirements in relation to:
		2	Authorisation for the work to proceed
		3	The availability of appropriate access to all required work areas
		4	The inspection and testing of existing electrical installations
		5	The proposed siting of key system components
		6	The suitability of the building structure/site in relation to the proposed installation
		7	The suitability of the proposed location and position of the turbine for optimum power generation
		8	Confirm that the tools, materials and equipment required for the micro wind installation work are available and are in a safe usable condition.
17	Install micro wind systems	1	Install a micro wind turbine arrangement and system components in accordance with manufacturer's guidance, regulatory requirements and industry recognised procedures to include as a minimum the positioning, fixing and connection of the following components:
		2	Anemometer
		3	Blades
		4	Brake
		5	Controller
		6	Gearbox
		7	Generator
		8	High speed shaft
		9	Low speed shaft
		10	Nacelle
		11	Hub
		12	Wind vane
		13	Yaw drive
		14	Yaw motor
18	Inspect and test a micro wind system	1	Undertake the electrical installation tests relevant to micro wind systems
		2	Undertake performance tests on micro wind systems, including:
		3	Using an anemometer (at hub height)
		4	Using the system display meter
		5	Complete relevant inspection, testing and certification records in accordance with manufacturer's requirements and the relevant regulatory requirements
19	Commission a micro wind system	1	Undertake the pre-commissioning procedures and/or requirements for testing a micro wind system in relation to:



		2	Turbine siting
		3	Turbine support and site work
		4	Turbine installation
		5	Turbine output cables
		6	Turbine isolator
		7	Turbine junction box
		8	Earthing and lightning protection
		9	Turbine metering
		10	Turbine controller
		11	Provision of labelling/signage
		12	Undertake the regulatory and industry pre-commissioning test requirements for distribution network (grid) connected micro wind systems:
		13	General design checks
		14	Battery specification checks
		15	Installation checks
		16	Identify the design requirements, manufacturer's requirements, client's requirements, regulatory requirements and industry requirements for the commissioning of the system
		17	Confirm that conditions are suitable to implement commissioning procedures
		18	Commission the system in accordance with design requirements, manufacturer's requirements, client's requirements, regulatory requirements and industry requirements for the commissioning of the system
		19	Complete relevant documentation to record the commissioning activities in accordance with manufacturer's requirements and the relevant regulatory requirements
20	Handover a micro wind system	1	Undertake relevant checks to ensure that the system is ready for handover and compliant with manufacturer's guidance, regulatory requirements and industry recognised requirements
		2	Explain and demonstrate to the end user the operation and use of the system using manufacturer's guidance and industry agreed handover procedures
		3	Identify and explain to the end user any aspects of the system that varies from the agreed specifications and requirements
		4	Obtain acceptance by the end user of the system according to the industry agreed handover procedures
		5	Ensure that all relevant handover documentation is correctly completed and recorded in the appropriate information systems and passed to the end user in accordance with manufacturer's guidance and industry recognised procedures



21	Undertake the routine service and maintenance of micro wind systems	1	Obtain the relevant information required to enable the work
		2	Undertake, using safe systems of work, a visual service and maintenance inspection to include checks in relation to:
		3	Compliance with manufacturer's installation instructions
		4	Compliance with statutory regulations
		5	The condition of the micro wind mounting arrangement
		6	The condition of system components
		7	The correct positioning of system components
		8	The security of fixing of system components
		9	Undertake, using safe systems of work, routine service and maintenance tests to include:
		10	Checking the condition of micro wind mounting arrangements
		11	Checking the condition of and cleaning of components
		12	Wind speed checks/tests
		13	Safe condition testing
		14	Functional testing
		15	Performance testing
		16	Adjustment of controls/components
		17	Complete the relevant service and maintenance records in accordance with industry recognised procedures
22	Undertake fault diagnosis work on micro wind systems	1	Obtain the relevant information required to enable the work
		2	Identify using safe systems of work, the cause of a minimum of three separate faults from the following list:
		3	Poor turbine output
		4	Excessive turbine noise, vibration and temperature
		5	Excessive generator noise, vibration and temperature
		6	Control panel/display meter function problems
		7	Agree with the relevant person(s) fault rectification procedures for the faults identified
23	Undertake fault rectification work on micro wind systems	1	Take relevant precautionary actions to prevent unauthorised use of the system prior to or during the fault rectification work
		2	Take relevant precautionary actions to minimise the risk of injury to self or others during the fault rectification work
		3	Rectify, using safe systems of work, a minimum of two separate faults from the following list:
		4	Poor turbine output
		5	Excessive turbine noise, vibration and temperature
		6	Excessive generator noise, vibration and temperature
		7	Control panel/display meter function problems
		8	Undertake post-rectification tests in accordance with manufacturer's guidance, regulatory requirements and



			industry recognised procedures to confirm that the system is in a safe, functional and efficient condition.
24	Construction Site Managers, to give them knowledge in order to effectively plan a construction site project.	1	Identify the sources of information required to communicate and plan construction works. these include:
		2	Current master/overall programme and plans
		3	The contractual documents
		4	Statutory requirements including CDM regulations
		5	Internal and external resource information available for planning
		6	Recording documentation
		7	Responsibilities of associated personnel
		8	Areas of work subject to change
		9	Estimating data
		10	Pre-tender documentation
		11	Describe processes for obtaining and identifying planning information.
		12	Check planning information to identify inaccurate and missing information.
		13	Examine drawings, specifications and other documents relating to proposed construction projects in order to produce method statements. key aspects include:
		14	Prepare the site prior to starting work, identifying and developing alternatives
		15	Identify proposals which are not feasible
		16	Highlight proposals which do not conform with statutory requirements
		17	Determine proposals which represent unsafe working conditions
		18	Indicate proposals which will require special measures for execution
		19	Produce method statements for various activities and evaluate alternative construction methods for these activities.
		20	Identify and select appropriate planning tools for the task. relevant tools include:
		21	Supply lead times
		22	Resource schedules
		23	Identify the construction activities, and determine their durations.
		24	Combine these durations into a coherent overall programme for the works.
		25	Inspect the site and identify where proposed plans will not be feasible.
		26	Report findings and make recommendations to revise the proposed plans.



		27	Identify relevant administrative systems for running the site including the management of health and safety.
		28	Explain how to implement relevant administrative systems for running the site.
		29	Evaluate how the site staff use the administrative systems to ensure the project objectives are achieved.
		30	Assess the quantities and qualities of material needed for the work.
		31	Assess the plant and equipment needed for the work.
		32	Assess the labour needed for the work and sub-contractors
25	Construction Site managers, to give them the knowledge in order to be able to monitor and control a construction project.	1	Assess the quantities, quality and costs of the materials needed for the works.
		2	Check and confirm that all materials proposed or provided for the contract comply with the relevant specifications and requirements, and are available to meet the contract programme of work.
		3	Complete records and administrative procedures for calling forward, notifying and receiving materials on site.
		4	Assess and record actual performance and compare with the contract programme and specification.
		5	Identify sub-standard materials and arrange replacements.
		6	Check that plant and equipment is used in accordance with the relevant operating instructions and regulations, and take account of environmental issues.
		7	Check that plant and equipment is maintained to provide safe and effective operation and is safely and securely stored when not in use.
		8	Keep records of plant and equipment receipts, usage and disposal.
		9	Read and interpret mechanical and electrical services drawings.
		10	Prepare and use a check list to monitor the progress of installation work.
		11	Identify the forms of specification used in mechanical and engineering services and describe their application to quality control of work.
		12	Discuss technical aspects of a service installation and negotiate with designers and contractors to resolve problems.
		13	Determine deviations from the specified materials and construction methods of service installation.
		14	Determine the sequence of installation of a service system.
		15	Explain the requirement and procedures for testing services installations during the construction period.



		16	Witness the necessary testing and commissioning of service installation in accordance with contract information and performance manuals.
		17	Hand over completed service installation to the client.
		18	Ensure that work is carried out in a ways that conform to planning requirements.
		19	Ensure that the site work is conducted in ways which conform to the requirements of the building regulations and the relevant building control procedures.
		20	Identify the responsibility for listed buildings in conservation areas.
		21	Explain the ways in which tree preservation orders affect site operations.
		22	Identify the persons having right of entry on to a site.
		23	Monitor and implement site measures to ensure compliance with legal obligations in respect of negligence, nuisance and trespass.
		24	Implement the necessary measures to be taken when working adjacent to, on or above a highway.
		25	Describe the process a construction site manager must undertake on discovery of archaeology on site.
27	Construction Site Managers to give them the knowledge to be able to manage quality control on a construction site.	1	Interpret drawings, specifications and other documents relevant to the quality of the work.
		2	Convey quality requirements to all levels of the construction team. these include:
		3	Appearance
		4	Performance
		5	Structural soundness
		6	Dimensional accuracy
		7	Explain the responsibilities and tasks of those involved in ensuring the quality of the work through appropriate construction technology.
		8	Explain the role of statutory documents in determining quality control:
		9	Building regulations
		10	Codes of practice
		11	British standards
		12	Agreement certificates
		13	Contract documents
		14	Contract drawings
		15	Technical specifications
		16	Identify the areas of work where defects are likely to occur.
		17	Explain the necessity for carrying out on-site and off-site testing.



		18	Carry out inspections of completed and partially completed work to ensure that project and statutory requirements are complied with.
		19	Evaluate the results of on-site and off-site material tests and inspections.
		20	Ensure that the workforce is aware of sustainability issues on site.
		21	Delegate responsibility for the protection of the environment on site.
		22	Assess the significance of sustainability factors insofar as they affect the quality of the project and take appropriate action.
		23	Keep records of environmental issues insofar as they affect the quality of the project and report to the people responsible.
28	Construction Site Managers to give them knowledge to be able to manage dimensional control on a construction site.	1	Identify and interpret the information available or required to carry out the setting out or levelling procedures. this will include:
		2	Existing levels and datum's
		3	Drawings and specifications
		4	Tolerances
		5	Check the setting out information for accuracy and consistency with site conditions.
		6	Identify any variances, and how to resolve these.
		7	Describe the need to adhere to specified tolerances for a range of commonly used materials and components.
		8	Describe with examples the need for attention to safety whilst carrying out surveying, levelling and setting-out operations.
		9	Use the correct terminology for setting out.
		10	Check that the surveying equipment is properly calibrated.
		11	Establish datum points on site from information given on drawings and schedules.
		12	Set out the work from the datum points. this includes:
		13	Lines
		14	Levels
		15	Angles
		16	Distances
		17	Curves
		18	And the use of:
		19	Tape
		20	Optical square
		21	Surveyor's level
		22	Theodolite
		23	Set out site rails and travellers for excavations.





		24	Keep records of setting out for control and quality assurance purposes.
29	Construction Site Managers to provide the knowledge in order to be able to apply the management skills when dealing with sub-contractors on site.	1	Describe the legal requirements of the contract and the relationship between sub-contractor and clients with particular reference to the process leading to the contract.
		2	Identify types of attendance, i.e.:
		3	General attendance
		4	Special attendance
		5	Explain the responsibility of the contractor and sub-contractor for special attendance/general attendance.
		6	Identify the contractor's responsibilities for the sub-contract materials.
		7	Assess the responsibility for protection and acceptance of finished work.
		8	Describe the difference between the obligations attached to the main contractor in respect of the following and describe when each would be used:
		9	Domestic
		10	Nominated
		11	Named
		12	Labour only
		13	Specify work requirement to sub-contractors to meet organisational requirements.
		14	Prepare site plans for the delivery, handling, placing and storage of supplies and equipment from supplier and sub-contractors.

Soft Skills			
No.	Objective	No.	Criteria
Intentionally Blank			

Other			
No.	Objective	No.	Criteria
Intentionally Blank			



**Additional Guidance**

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