



MCS Company Scheme Criteria for:

Wind Turbine 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.



Health and Safety Skills			
No.	Objective	No.	Criteria
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

Technical Skills			
No.	Objective	No.	Criteria
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	1	State the cable sizing requirements for micro wind turbines in relation to:
		2	V(max) and I(max)



	mounting micro wind turbines	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		1	Recognise the following micro wind systems:
		2	Direct connected systems



Know the layouts and the requirements for installing micro wind 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
		1	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	2	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:
		3	Anemometer
		4	Blades
		5	Brake
		6	Controller
		7	Gearbox
		8	Generator
		9	High Speed Shaft
		10	Low speed shaft
		11	Nacelle
		12	Hub
		13	Wind vane
		14	Yaw drive
		15	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.



Soft Skills			
No.	Objective	No.	Criteria
Intentionally Blank			

Other			
No.	Objective	No.	Criteria
Intentionally Blank			

Additional Guidance			
Intentionally Blank			

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