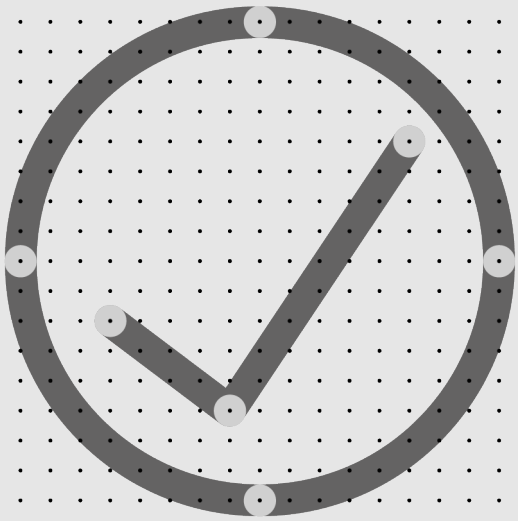
STANDARDS DOCUMENT

MCS 020 b) ISSUE 1.0

Wind Turbine Sound Calculation

(For Permitted Development Installations)



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ABOUT MCS

Giving you confidence in home-grown energy

With energy costs constantly rising and climate change affecting us all, low-carbon technology has a bigger and bigger role to play in the future of UK energy.

We're here to ensure it's a positive one.

Working with industry we define, maintain and improve quality – certifying products and installers so people can have confidence in the low-carbon technology they invest in. From solar and wind, to heat pumps, biomass and battery storage, we want to inspire a new generation of home-grown energy, fit for the needs of every UK home and community.

About

The Microgeneration Certification Scheme Service Company Ltd (MCSSCo Ltd) trades as MCS and is wholly owned by the non-profit MCS Charitable Foundation. Since 2007, MCS has become the recognised Standard for UK products and their installation in the small-scale renewables sector.

We create and maintain standards that allow for the certification of products, installers and their installations. Associated with these standards is the certification scheme, run on behalf of MCS by Certification Bodies who hold UKAS accreditation to ISO 17065.

MCS certifies low-carbon products and installations used to produce electricity and heat from renewable sources. It is a mark of quality. Membership of MCS demonstrates adherence to these recognised industry standards; highlighting quality, competency and compliance.

Vision

To see MCS certified products and installations in every UK home and community.

Mission

To give people confidence in low-carbon energy technology by defining, maintaining and improving quality.

Values

1. We are expert – ensuring quality through robust technical knowledge
2. We are inspiring – helping to reshape energy in UK homes and communities
3. We are collaborative – working with industry and government to create positive change
4. We are principled – operating in a way that's clear, open and fair
5. We are determined – supporting the UK's drive towards a clean energy future

CHANGES TO STANDARDS

When MCS Standards are revised, the issue number is also revised to indicate the nature of the changes. This can either be a whole new issue or an amendment to the current issue. Details will be posted on the website at www.mcscertified.com

Technical or other significant changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments.

The issue number is given on the left of the decimal point, and the amendment number on the right. For example, issue 3.2 indicates that it is the third significant version of the document which has had two sets of minor amendments.

Users of this Standard should ensure that they are using the latest issue.

Amendments issued since publication

Issue No.	Amendment Details	Date
1.0	First Publication	20/03/2025

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FOREWORD

The previous MCS 020 Standard combined air source heat pumps and wind turbines into one standard. These have now been separated into two new Standards; MCS 020 a) (for air source heat pumps) and MCS 020 b) (for wind turbines).

Compliance with this Standard is mandatory for installers seeking to install wind turbines for Permitted Development from the date of publication.

The requirements and procedures within this Standard for wind turbines are no different to those within MCS 020 Issue 1.3.

NOTES:
This standard makes use of the terms 'must', 'shall' and 'should' when prescribing certain requirements and procedures. In the context of this document:

- the term 'must' identifies a requirement by law at the time of publication;
- the term 'shall' prescribes a requirement or procedure that is intended to be complied with in full and without deviation;
- the term 'should' prescribes a requirement or procedure that is intended to be complied with unless reasonable justification can be given.

1 INTRODUCTION, PURPOSE & SCOPE

1.1 This document sets out the sound calculation which must be conducted for domestic installations of wind turbines to be 'permitted development'.

1.2 It is designed to allow MCS Contractors to establish clearly whether an installation will comply with the permitted development noise limit of 42 dB $L_{Aeq,5mins}$. The Standard, and the notes and calculations carried out by the MCS Contractor will also be used by local planning authorities and MCS to verify compliance.

1.3 Compliance with MCS 020 b) on its own does not bestow permitted development rights – there are a number of other conditions and limitations which must be complied with for an installation to be permitted development. The full requirements for installations in England can be found at www.planningportal.gov.uk. Requirements in other countries may differ. Installers are advised to contact the local planning authority with any queries.

1.4 MCS Contractors shall be under a duty to ensure compliance with MCS 020 b) in relation to any installation carried out as permitted development. The MCS may impose penalties or sanctions if an MCS Contractor fails to ensure compliance with this Standard prior to undertaking an installation. An installation which does not meet this Standard may be subject to enforcement action by the local planning authority.

1.5 Contractors shall complete one table for each assessment position that could potentially be affected by noise from the wind turbine. To follow the instructions and complete the table, installers will need to refer to the notes set out after the table.

2 METHODOLOGY

2.1 REQUIREMENTS

2.1.1 Compliance to MCS 020 b) is as follows:

(a) The wind turbine product shall be certificated in accordance with MCS 006;

(b) The wind turbine product shall be installed by an MCS Contractor certificated in accordance with MIS 3003; and

(c) The installation shall be carried out in compliance with the calculation procedure contained in Table 1. MCS Contractors must complete the 'result/notes' column in Table 1 for each step of the calculation procedure to show how it has been followed.

2.2 CALCULATION PROCEDURE

2.2.1 The wind turbine calculation procedure is set out in Table 1 of this section. MCS Contractors must complete this table for the assessment position nearest to the proposed wind turbine. To follow the instructions and complete the table, MCS Contractors will need to refer to the definitions at the start of the table and Notes 1-5 set out after the table. A glossary of terms can be found in Section 3.

2.2.2 MCS Contractors must insert their results in the 'results/notes' column for each step of the calculation procedure to show how it has been followed. MCS Contractors must retain one copy of the completed table for their records and provide another copy to the client.

2.2.3 Explanation of the calculation procedure is supported by a worked example which is in the italics at the end of each step in the table. In the example a free-standing wind turbine with a rotor hub of 10.2 metres is used. The example assessment position is 108 metres away. This example is used for the purposes of illustrating the calculation procedure only.

TABLE 1

Definitions: For the purposes of the Standard:

- Assessment position means a position one metre external to the centre point of any door or window to a habitable room of a neighbouring property as measured perpendicular to the plane of the door or window.

- Habitable room means a room other than a bathroom, shower room, water closet or kitchen.

- Neighbouring property means any building used for any of the purposes of Class C of the Town and Country Planning (Use Classes) Order 1987 (as amended) (includes dwellings, houses, hotels, residential institutions and houses in multiple occupation). In instances where the proposed wind turbine will be free standing or is to be installed on a detached building within the curtilage of a block of flats, neighbouring property includes flats within the same block of flats (excluding the flat of the 'owner(s)' of the wind turbine). Building mounted wind turbines installed on blocks of flats are not permitted development.

Description of assessment position that is nearest to the proposed wind turbine (This must be detailed enough to allow for identification, including property address and exact location of window/ door opening and floor level. It is recommended that a map, sketch, photo or other record be attached to these workings.)	Slant distance to nearest assessment position. (See Note 5: Slant distance)
Example: The nearest assessment position is a ground floor south facing window on The Meadows, Sheriff Lane, Gl/stead, BO16 3LS, 108 metres to the north of the proposed turbine location.	*108 metres*

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Step	Instructions	MCS contractor results/ notes
1	Obtain the Ordinance Survey grid reference for the location of the proposed turbine. Eight character grid references must be shortened to six character grid references. See 'Note 1: DECC wind speed database'. *Example: The proposed wind turbine will be installed at eight character grid reference* SE125391*This must be shortened to a six character grid reference (i e SE1239).*	STEP 1 RESULT =
2	Use the DECC wind speed database to obtain wind data at 10metres above ground level. See 'Note 1: DECC wind speed database'. *Example. The DECC wind speed database says that grid reference SE1239 is 4.3 m/s at 10 metres above ground level.*	STEP 2 RESULT=
3	Calculate the wind speed using the following calculation (rounding to two decimal places). See 'Note 2: 1.72 Figure'. 1.72 x (STEP 2 RESULT)	STEP 3 RESULT=

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	Example. 1.72 x 4.3=7.39 m/s	
4	Calculate the rotor centre (hub) height of the wind turbine. See 'Note 3: Rotor centre (hub) height' *Example: The rotor centre (hub) height is 10.2 metres.*	STEP 4 RESULT=

5	Calculate the wind speed at the rotor centre (hub) height using the following calculation (rounding to one decimal place). (STEP 3 RESULT) x (STEP 4 RESULT/ 10)^{02} *Example. 7.39 x (10.2/10)^{02}= 7.4 m/s*	STEP 5 RESULT=
6	Draw a horizontal line from (STEP 5 RESULT) on the 'wind speed (m/s) at hub' side of the noise map to where the red and green lines meet. Draw a vertical line from where the red and green lines meet to the bottom of the noise map and read off the 'slant distance (m) from rotor centre' value. (see Note 4: Noise label and Note 5: Slant distance). *Example. 'Slant distance from rotor centre' value reads off as 51 metres.*	STEP 6 RESULT=

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7	Is the result from STEP 6 lower than the slant distance to the nearest assessment position? If <u>YES</u> - the wind turbine will comply with the permitted development noise limit and may be permitted development (subject to compliance with other permitted development limitations/conditions and parts of this standard}. If <u>NO</u> - the wind turbine will not be permitted development. This installation may still go ahead if planning permission is granted by the local planning authority.	FINAL RESULT= YES/NO (delete as appropriate)

	Example. 51 metres is less than 108 metres. Therefore the wind turbine in this location may be permitted development (subject to compliance with other permitted development limitations/conditions)	

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NOTE 1: DECC WIND SPEED DATABASE (STEP 1 AND STEP 2)

The Department of Energy and Climate Change (DECC) wind speed database can be accessed via the following link

https://www.gov.uk/guidance/onshore-wind-part-of-the-uks-energy-mix#windspeed-database

The database does not contain live data but can be used for reference purposes as part of the calculation procedure.

A six character grid reference for the location of the proposed wind turbine should be used (e g TIV11494) The section in the wind speed database titled 'using the wind speed database' provides advice on obtaining a grid reference Eight character grid references (e.g. SE125391) must be shortened by removing the 5th and 8th characters (e.g. SE12~~5~~391~~-~~ = SE1239).

The wind speed database should be used to obtain the annual mean wind speed data for the site. From the link above click on 'access the interactive database online'. Input the six character grid reference in the box at the bottom of the page and click 'find wind data'. The highlighted yellow figure in the "wind speed at 10m agl (in m/s)" box is the figure needed to fulfil Step 2.

NOTE 2: 1.72 FIGURE (STEP 3)

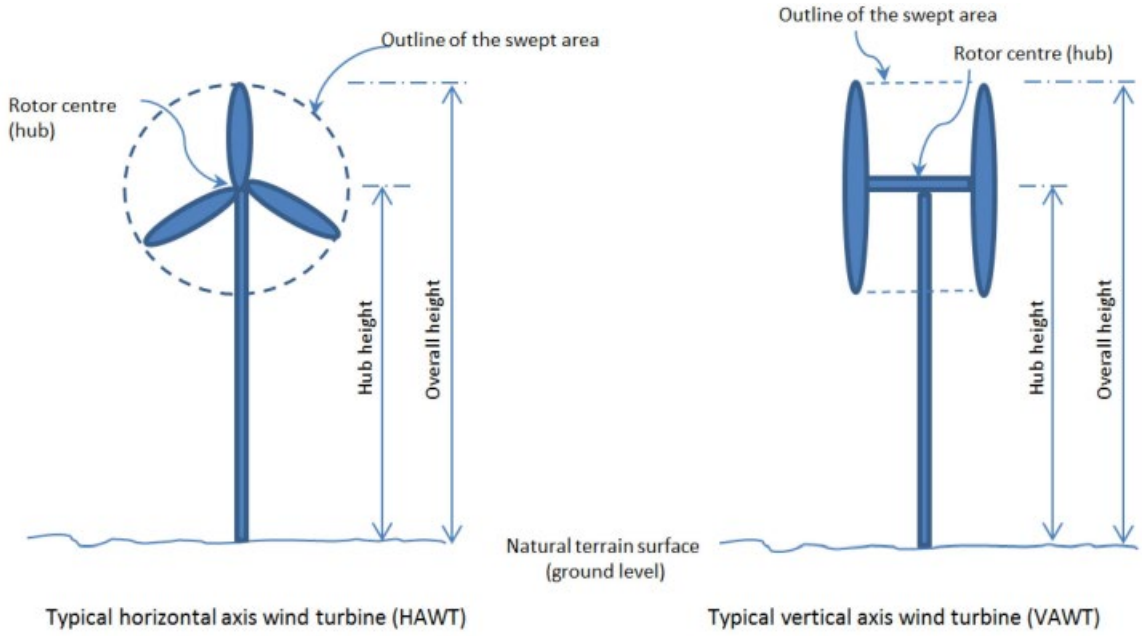
For information the factor 1.72 converts the DECC wind speed database result, which represents an annual average windspeed, to a higher windspeed typical of the windspeed that would be exceeded no more than 10% of the time.

NOTE 3: ROTOR CENTRE (HUB) HEIGHT (STEP 4)

The rotor centre (hub) height will be the vertical distance between natural ground level and the rotor centre (hub) of the proposed wind turbine. The rotor centre (hub) is the geometric centre of the swept area of the wind turbine rotor. The rotor centre (hub) height is illustrated below.

The natural ground level should be used. This is the level of the ground immediately adjacent to the proposed wind turbine. Where the ground level is not uniform (e.g. if the ground is sloping) then the ground level is the highest part of the surface of the ground next to the proposed wind turbine (excluding any base structures). The natural ground level should not include any additional structures laid on top of the ground such as a concrete base.

Rotor centre (hub) illustration:



Typical horizontal axis wind turbine (HAWT)

Typical vertical axis wind turbine (VAWT)

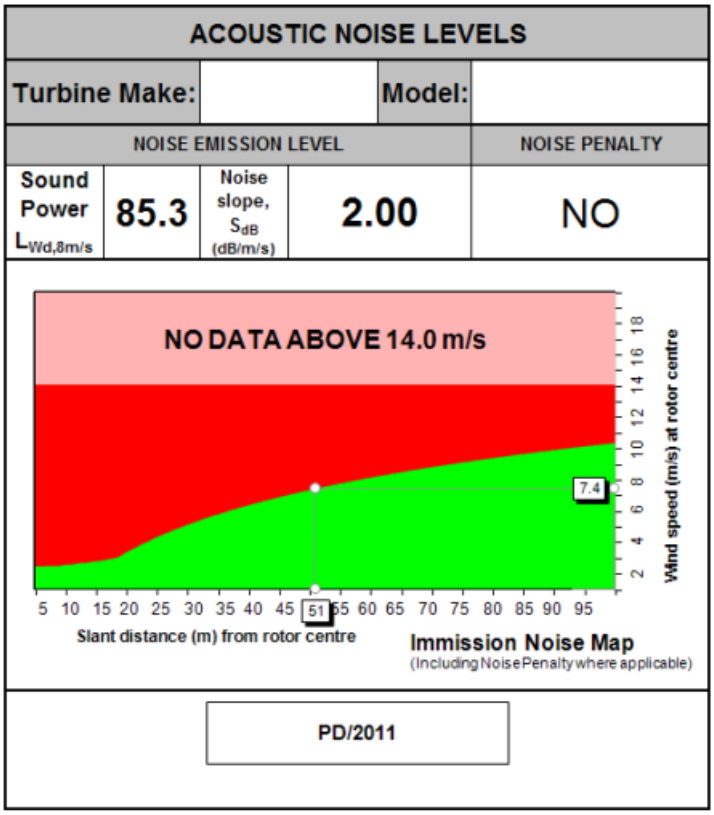
NOTE 4: NOISE LABEL (STEP 6 AND STEP 7)

The noise label summarises the acoustic data for the wind turbine. Each turbine will have its own product specific noise label, which can be obtained from the manufacturer.

Each noise label contains a noise map. The noise map shows colour coded zones where sound (free field) from the wind turbine at distances from the turbine rotor centre (hub) is likely to fall within the following ranges:

- Red - greater than permitted development noise limit of 42 dB $L_{AEQ, 5\ mins}$
- Green - less than permitted development noise limit of 42 dB $L_{AEQ, 5\ mins}$

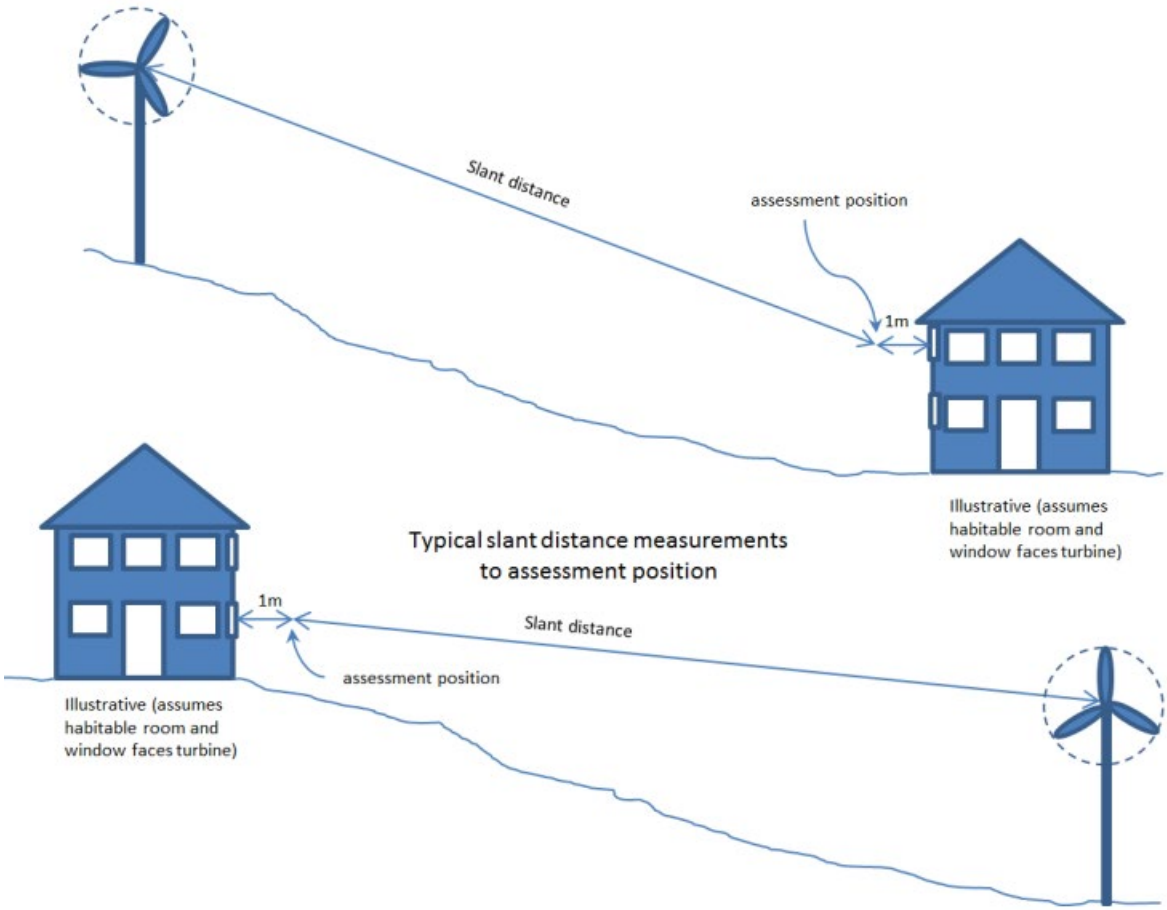
An example noise label containing a noise map is provided below. This is included in the purposes of the worked example only. The example noise map also contains a pink zone, which indicates that no data was available. Zones where data is not available should be regarded as red for the purposes of the calculation procedure. Acoustic data for the proposed wind turbine should be obtained from the product manufacturer.



The noise map can be read by drawing a horizontal line from the recorded wind speed at the hub (right hand side of the map) to where the red and green lines meet. Drawing a vertical line from the point to the bottom of the map will give the maximum slant distance in metres from rotor centre (hub) at which a wind turbine could be installed to stay within the noise range. For clarity, MCS Contractors must draw a single line that is no greater than the thickness of a standard biro.

NOTE 5: SLANT DISTANCE

The slant distance is measured by drawing a straight line on a 1:500 scaled elevation plan (to be attached to the completed calculation procedure) between the rotor centre (hub) of the wind turbine and the assessment position, taking account of any difference in levels between the two points. The straight line is then measured to give the slant distance. This is illustrated below.



3 GLOSSARY OF TERMS

Term	Definition
Agl	Above ground level.
Attenuation	Reduction in the intensity of sound due to absorption, scattering or spreading.
dB	A logarithmic unit used to describe a ratio. When used in the context of acoustics dB represents the ratio of a measured sound pressure to a reference sound pressure. A doubling of sound pressure gives rise to an increase of 3 dB.
dB(A)	The sound pressure ratio described using the A-weighting network. The A-rating network is commonly used to represent the frequency response of the human ear.
Hub	Fixture for attaching the blades or blade assembly to the rotor shaft.
$L_{Aeq, 5mins}$	The A weighted equivalent continuous sound level over a 5 minute period that contains the same sound energy as the actual varying sound over the same time period.
MCS	The Microgeneration Certification Scheme which certificates products and MCS Contractors of renewable technologies.
Permitted Development	Exemption from the requirement to seek express planning permission for certain minor works. Permitted development rights are laid down in the General Permitted Development Order 1995 (as amended) (SI. No 418).
Rotor	Rotating part of a machine e.g. a wind turbine.
Rotor centre	The geometric centre of the swept area of the wind turbine rotor, also known as the hub.
Swept area	Projected area perpendicular to the wind direction that a rotor will describe during one complete rotation.
Use Class Order	The Town and Country Planning (Use Classes) Order 1987 (as amended) (SI. No 764). Define uses of land and buildings and puts these into various categories known as 'Use Classes'.

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