

MICROGENERATION INSTALLATION STANDARD: MCS 020

MCS Planning Standards for Permitted
Development Installations of Wind
Turbines and Air Source Heat Pumps
on Domestic Premises

This Standard has been approved by the Steering Group of the Microgeneration Certification Scheme.

This standard was prepared by MCS, Defra, DECC and DCLG.

REVISION OF MICROGENERATION INSTALLATION STANDARDS

Microgeneration Installation Standards will be revised by issue of revised editions or amendments. Details will be posted on the website at www.mcscertified.com

Technical or other 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 will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

Users of this Standard should ensure that they possess the latest issue and all amendments.

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1. INTRODUCTION

- 1.1 This document sets out the MCS Planning Standard which must be complied with for domestic installations of wind turbines and air source heat pumps to be 'permitted development'.
- 1.2 It is designed to allow MCS Contractors to establish clearly whether an installation will comply with the MCS Planning Standard and includes a calculation procedure designed to confirm whether the permitted development noise limit of 42 dB $L_{Aeq,5 mins}^*$ would be met. The Standard, and the notes and calculations carried out by MCS Contractor, will also be used by local planning authorities and the MCS to verify compliance.
- 1.3 Compliance with the MCS Planning Standard 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. MCS Contractors are advised to contact the local planning authority with any queries.
- 1.4 MCS Contractors shall be under a duty to ensure compliance with the MCS Planning Standard 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 MCS Planning Standard prior to undertaking an installation. An installation which does not meet the MCS Planning Standard may also be subject to enforcement action by the local planning authority.
- 1.5 Section 2 of this document outlines the MCS Planning Standard for the installation of a wind turbine. Section 3 outlines the MCS Planning Standard for the installation of an air source heat pump. The standards contained in these sections must be used independently of each other and only for the purposes of establishing whether a proposed installation will meet one of the requirements to be permitted development. Section 4 contains a glossary of terms.
- 1.6 MCS Certification Bodies shall be able to limit the scope of an MCS Contractor's certification against this standard if required, i.e. the MCS Certification Body will be able to certificate an MCS Contractor against either Section 2 of this document, Section 3 of this document, or both Sections 2 and 3 of this document.

* at the assessment position (ignoring the effect of that façade)

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2. MCS PLANNING STANDARD FOR WIND TURBINES

2.1 The MCS Planning Standard for wind turbines is as follows:

- (a) The wind turbine product shall be certificated in accordance with MCS 006¹;
- (b) The wind turbine shall be installed by an MCS Contractor certificated in accordance with MIS 3003²; 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.

WIND TURBINE CALCULATION PROCEDURE

- 2.2 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 4.
- 2.3 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.
- 2.4 Explanation of the calculation procedure is supported by a worked example which is in italics at the end of each step in the table. In the example a free-standing wind turbine

¹The Microgeneration Certification Scheme standard MCS 006 – Issue 2.1. **Product Certification Scheme Requirements: Micro and Small Wind Turbines**. Dated 15/01/2014

²The Microgeneration Certification Scheme MCS Contractor Standard MIS 3003 – Issue 3.4. Requirements for contractors undertaking the supply, design, installation, set to work commissioning and handover of micro and small wind turbine systems. Dated 01/05/2015

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with a rotor hub height 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

Date calculation undertaken:	
Definitions: For the purposes of this standard:	
<ul style="list-style-type: none"> • 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. 	
<p>Description of assessment position that is nearest to the proposed wind turbine</p> <p>(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.)</p>	<p>Slant distance to nearest assessment position. (See <u>Note 5: Slant distance</u>)</p>
<p><i>Example: The nearest assessment position is a ground floor south facing window on The Meadows, Sheriff Lane, Gilstead, BD16 3LS, 108 metres to the north of the proposed turbine location.</i></p>	<p>108 metres</p>

Step	Instructions	MCS contractor results / notes
1.	<p>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 <u>'Note 1: DECC wind speed database'</u>.</p> <p><i>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).</i></p>	STEP 1 RESULT =
2.	<p>Use the DECC wind speed database to obtain wind data at 10metres above ground level. See <u>'Note 1: DECC wind speed database'</u>.</p> <p><i>Example: The DECC wind speed database says that grid reference SE1239 is 4.3 m/s at 10 metres above ground level.</i></p>	STEP 2 RESULT =
3.	<p>Calculate the wind speed using the following calculation (rounding to two decimal places). See <u>'Note 2: 1.72 Figure'</u>.</p> <p>1.72 x (STEP 2 RESULT)</p> <p><i>Example: 1.72 x 4.3 = 7.39 m/s</i></p>	STEP 3 RESULT =
4.	<p>Calculate the rotor centre (hub) height of the wind turbine. See <u>'Note 3: Rotor centre (hub) height'</u></p> <p><i>Example: The rotor centre (hub) height is 10.2metres.</i></p>	STEP 4 RESULT =

5.	<p>Calculate the wind speed at the rotor centre (hub) height using the following calculation (rounding to one decimal place).</p> <p>$(\text{STEP 3 RESULT}) \times (\text{STEP 4 RESULT} / 10)^{0.2}$</p> <p><i>Example: $7.39 \times (10.2 / 10)^{0.2} = 7.4 \text{ m/s}$</i></p>	STEP 5 RESULT =
6.	<p>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. (<u>see Note 4: Noise label and Note 5: Slant distance</u>).</p> <p><i>Example: 'Slant distance from rotor centre' value reads off as 51 metres.</i></p>	STEP 6 RESULT =
7.	<p>Is the result from STEP 6 lower than the slant distance to the nearest assessment position?</p> <p>If YES - 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).</p> <p>If NO - the wind turbine will not be permitted development. This installation may still go ahead if planning permission is granted by the local planning authority.</p>	<p>FINAL RESULT =</p> <p>YES/NO (delete as appropriate)</p>

	<p><i>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).</i></p>	
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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. TM1494). 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~~3~~9~~1 = 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.

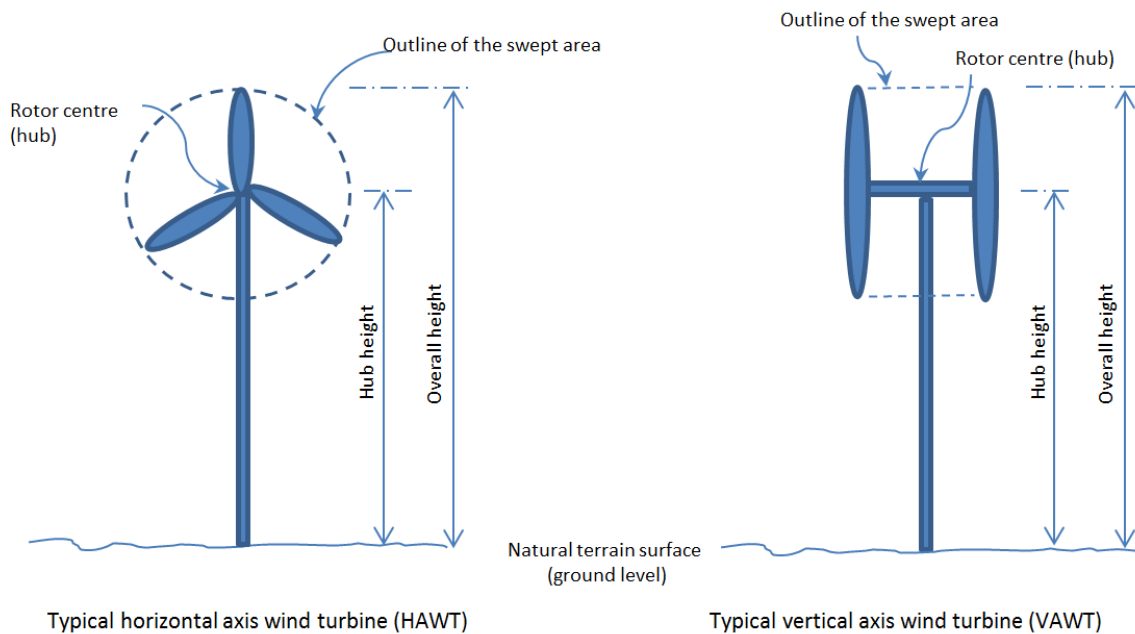
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NOTE 3: ROTOR CENTRE (HUB) HEIGHT (STEP 4)

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



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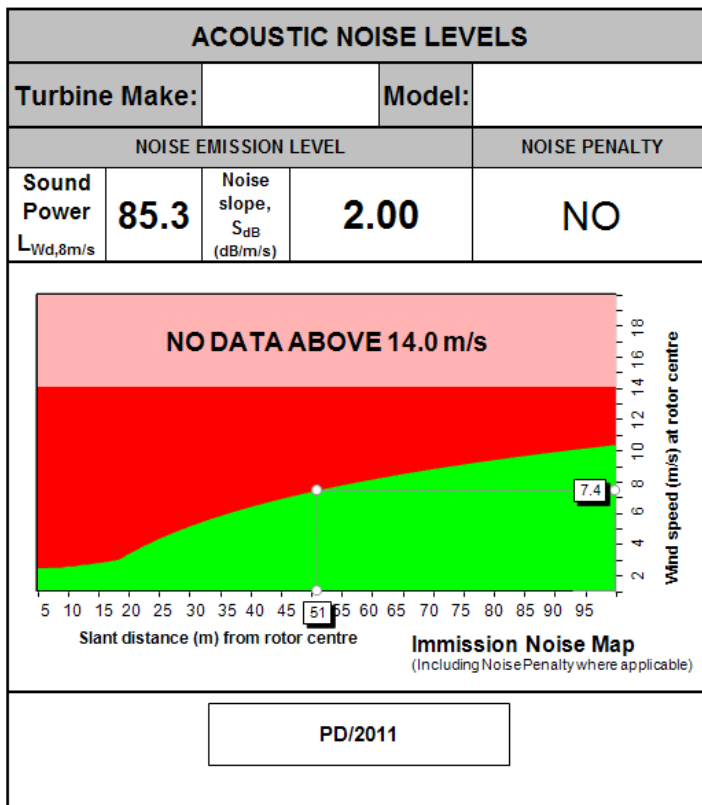
NOTE 4: NOISE LABEL (STEPS 6 & 7)

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 for 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 this calculation procedure. Acoustic data for the proposed wind turbine should be obtained from the product manufacturer.



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The noise map can be read by drawing a horizontal line from the recorded wind speed at hub (right hand side of the map) to where the red and green lines meet. Drawing a vertical line from

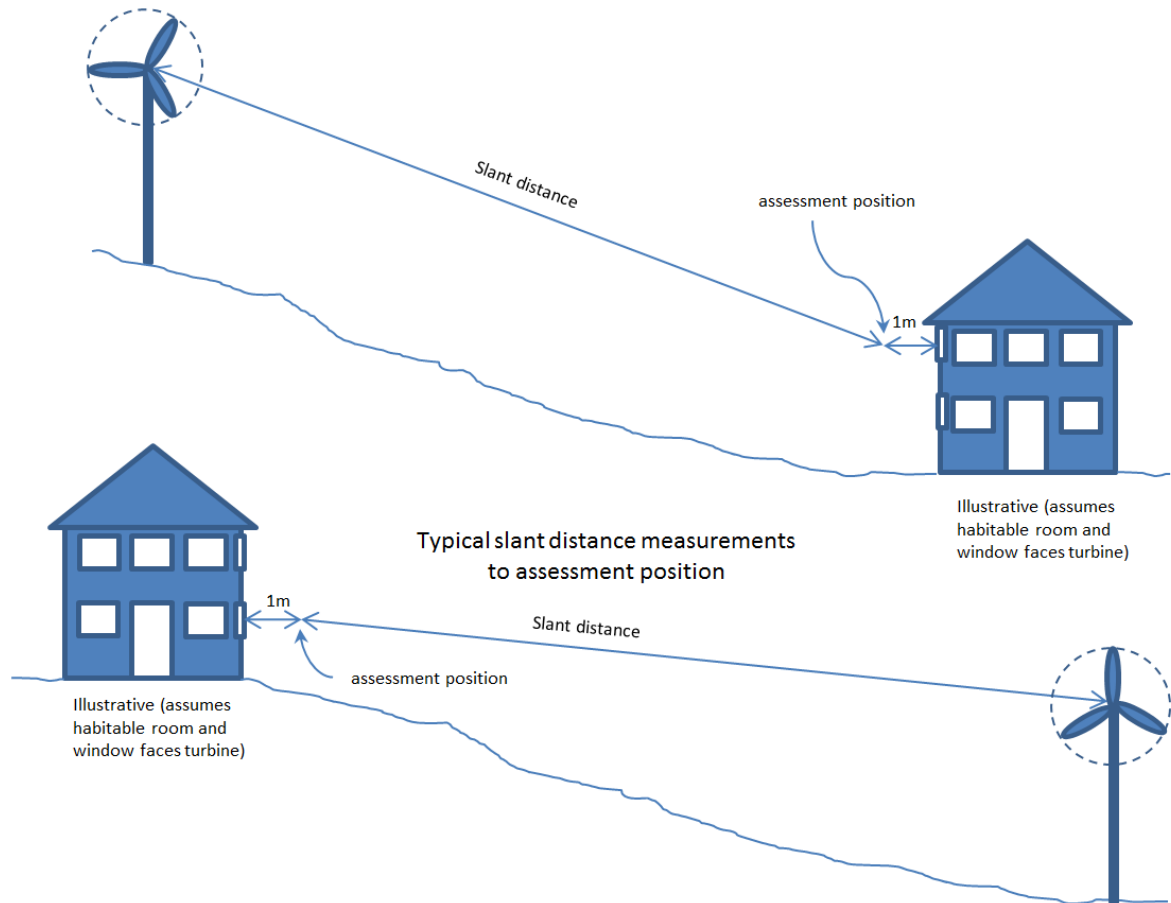
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this point to the bottom of the map will give the maximum slant distance in metres from rotor centre (hub) at which a wind turbine could be installed to stay within the noise range. For clarity, MCS Contractors must draw a single line that is no greater than the thickness of a standard biro.

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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.



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3. MCS PLANNING STANDARD FOR AIR SOURCE HEAT PUMPS

3.1 The MCS Planning Standard for air source heat pumps is as follows:

- (a) The air source heat pump product shall be certificated in accordance with MCS 007³;
- (b) The air source heat pump shall be installed by an MCS Contractor in accordance with MIS 3005⁴; and
- (c) The installation shall be carried out in compliance with the calculation procedure contained in Table 2. MCS Contractors must complete the 'results/notes' column in Table 2 for each step of the calculation procedure to show how it has been followed.

AIR SOURCE HEAT PUMP CALCULATION PROCEDURE

3.2 The air source heat pump calculation procedure is set out in Table 2. MCS Contractors must complete one table for each assessment position that could potentially be affected by noise from the air source heat pump. 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 1-7 set out after the table. A glossary of terms can be found in Section 4.

3.3 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.

3.4 Explanation of the calculation procedure is supported by a worked example which is in italics at the end of each step in the table. In the example, an air source heat pump with a sound power of 55 dB(A) mounted on the ground and against a single wall is used. An assessment position is 4 metres away. This example is used for the purposes of illustrating the calculation procedure only.

³The Microgeneration Certification Scheme Standard MCS 007 – Issue 4.0. Product Certification Scheme Requirements: Heat Pumps. Dated 01/05/2015

⁴The Microgeneration Certification Scheme MCS Contractor Standard MIS 3005 – Issue 4.2. Requirements for Contractors Undertaking the Supply, Design, Installation, Set to Work Commissioning and Handover of Microgeneration Heat Pump Systems. Dated 01/05/2015

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TABLE 2: USE ONE TABLE FOR EACH ASSESSMENT POSITION TESTED

<p>Date calculation undertaken:</p> <p>Note: for the purposes of this calculation procedure:</p> <ul style="list-style-type: none"> • 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 air source heat pump would be installed on block of flats, neighbouring property includes flats within the same block of flats (excluding the flat of the “owner(s)” of the air source heat pump). 		
<p>Description of assessment position tested</p> <p>(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.)</p>		
<p><i>Example: The assessment position is the first floor bedroom window of 1 Oak Street and it is 4 metres away from the location of the proposed air source heat pump.</i></p>		

Step	Instructions	MCS contractor results / notes
1.	<p>From manufacturer's data, obtain the A-weighted sound power level of the heat pump. See 'Note 1: Sound power level'. The highest sound power level specified should be used (the power in "low noise mode" should not be used).</p> <p><i>Example: Manufacturer's data states the sound power level of the heat pump is 55 dB(A).</i></p>	STEP 1 RESULT =
2.	<p>Use 'Note 2: Sound pressure level' and 'Note 3: Determination of directivity' below to establish the directivity 'Q' of the heat pump noise.</p> <p><i>Example: The heat pump is to be installed on the ground and against a single wall hence the directivity (Q) of the heat pump noise is Q4.</i></p>	STEP 2 RESULT =
3.	<p>Measure the distance from the heat pump to the assessment position in metres.</p> <p><i>Example: Distance between heat pump and assessment position is 4 metres.</i></p>	STEP 3 RESULT =
4.	<p>Use table in 'Note 4: dB distance reduction' below to obtain a dB reduction.</p> <p><i>Example: 4metres @ Q4 = -17 db.</i></p>	STEP 4 RESULT =

5.	<p>Establish whether there is a solid barrier between the heat pump and the assessment position using <u>Note 5: Barriers between the heat pump and the assessment position</u> and note any dB reduction.</p> <p><i>Example: There is a brick wall between the heat pump and the assessment position. Moving less than 25cm enables the assessment position to be seen. dB reduction = -5 dB.</i></p>	STEP 5 RESULT =
6.	<p>Calculate the sound pressure level (see <u>Note 2: Sound pressure level</u>) from the heat pump at the assessment position using the following calculation:</p> <p>(STEP 1) + (STEP 4) + (STEP 5)</p> <p><i>Example (55) + (-17) + (-5) = 55 - 17 - 5 = 33 dB(A) Lp</i></p>	STEP 6 RESULT =
7.	<p>Background noise level. For the purposes of the MCS Planning Standard for air source heat pumps the background noise level is assumed to be 40 dB(A) Lp. For information see <u>Note 6: MCS Planning Standard for air source heat pumps background noise level</u>.</p> <p><i>Example: Background noise level is 40 dB(A).</i></p>	STEP 7 RESULT = 40 dB(A)
8.	<p>Determine the difference between STEP 7 background noise level and the heat pump noise level using the following calculation:</p> <p>(STEP 7) - (STEP 6)</p>	STEP 8 RESULT =

	<p><i>Example: 40 dB(A) (background) – 33 dB(A) (heat pump) = 7dB(A).</i></p>	
9.	<p>Using the table in ‘<u>Note 7: Decibel correction</u>’ obtain an adjustment figure and then add this to whichever is the higher dB figure from <u>STEP 6</u> and <u>STEP 7</u>. <u>Round this number up to the nearest whole number.</u></p> <p><i>Example: Adjustment figure is 0.8 dB and the higher figure is 40 dB(A).</i></p> <p><i>40 + 0.8 = 40.8 dB(A).</i></p> <p><i>Rounded up to 41 dB(A)</i></p> <p><i>Final result at this assessment position is 41 dB(A).</i></p>	FINAL RESULT=
10.	<p>Is the FINAL RESULT in STEP 9 equal to or lower than the permitted development noise limit of 42.0 dB(A)?</p> <p>If <u>YES</u> – the air source heat pump will comply with the permitted development noise limit for this assessment position and may be permitted development (subject to compliance with other permitted development limitations/conditions and parts of this standard). NOTE - <u>Other assessment positions may also need to be tested.</u></p> <p>If <u>NO</u> – the air source heat pump will not be permitted development. This installation may still go ahead if planning permission is granted by the local planning authority.</p> <p><i>Example: 41 dB(A) is equal to or lower than 42.0 dB(A).</i></p>	<p>Final result is equal to or lower than 42.0 dB(A)</p> <p>YES / NO (delete as appropriate)</p>

NOTE 1: SOUND POWER LEVEL (STEP 1)

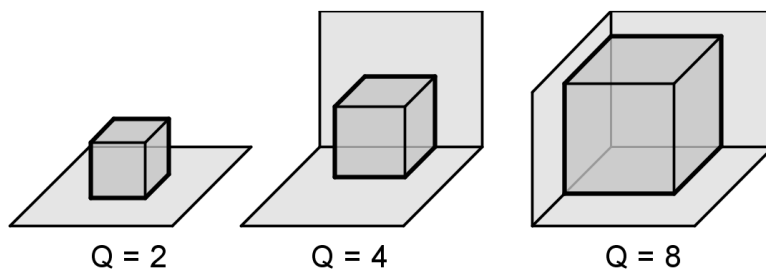
Sound power is the *total* acoustical energy emitted by a sound source and is an absolute value. It is **not** affected by the environment or the location of the listener.

NOTE 2: SOUND PRESSURE LEVEL (STEP 2)

Sound pressure is what we hear. It is a pressure disturbance at a specific point in the atmosphere whose intensity is influenced not only by the sound power of the source, but also by the surroundings and the distance from the source to the point at which the sound is heard.

NOTE 3: DETERMINATION OF 'DIRECTIVITY' (STEP 2)

The sound pressure level increases with the number of reflecting surfaces. Use the illustrations below to establish the directivity 'Q' for the installation. A reflective surface is any surface (including the ground) within 1 metre of the air source heat pump.



The following examples may be used as a guide:

- Q2 = an air source heat pump with one reflecting surface (i.e. the ground or a single wall if mounted on a wall off the ground).
- Q4 = an air source heat pump with two reflecting surfaces (i.e. ground mounted and against a wall or mounted off ground level against two walls)
- Q8 = an air source heat pump with three reflecting surfaces (i.e. ground mounted and against two walls or mounted off ground level between three walls).
- **NOTE – an air source heat pump with more than three reflective surfaces (for example those within small lightwells) will not meet the MCS planning standards.**

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NOTE 4: DB DISTANCE REDUCTION (STEP 4)

		Distance from Heat Pump (metres) (STEP 3 RESULT)													
		1	1.5	2	3	4	5	6	8	10	12	15	20	25	30
Q (STEP 2 RESULT)	2														
	2	-8	-11	-14	-17	-20	-21	-23	-26	-28	-29	-31	-34	-36	-37
	4	-5	-8	-11	-14	-17	-19	-20	-23	-25	-26	-28	-31	-33	-34
	8	-2	-5	-8	-11	-14	-16	-17	-20	-22	-23	-25	-28	-30	-31

Where a precise distance is not indicated in the above table, then the next lowest value for that distance should be used. E.g. if the distance was 2.5m, then the values for 2m should be used.

NOTE 5: BARRIERS BETWEEN THE HEAT PUMP AND THE ASSESSMENT POSITION (STEP 5)

A correction should be made for attenuation due to barriers between the air source heat pump and an assessment position. A correction will be necessary if an MCS Contractor is unable to see an assessment position from the top edge of the air source heat pump. Use the following instructions to determine whether a correction is appropriate:

- For a solid barrier (e.g. a brick wall or a fence) that completely obscures an MCS Contractor's vision of an assessment position from the top edge of the air source heat pump attenuation of -10 dB may be assumed.
- Where a solid barrier completely obscures an MCS Contractor's vision of an assessment position from the top or side edges of the air source heat pump, but moving a maximum distance of 25 cm in any direction to the air source heat pump allows an assessment position to be seen, attenuation of -5 dB may be assumed.
- If it is possible for an MCS Contractor to see any part of an assessment position from the top or side edges of the air source heat pump no attenuation may be assumed.

NOTE 6: MCS PLANNING STANDARD FOR AIR SOURCE HEAT PUMPS BACKGROUND NOISE LEVEL (STEP 7)

The MCS Planning Standard assumes a background noise level of 40 dB(A) for the purposes of the air source heat pump calculation procedure. A different value for background noise should not be used as part of this calculation procedure.

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NOTE 7: DECIBEL CORRECTION (STEP 9)

Please note that the left hand column should be used for both positive and negative differences (e.g. a difference of +3 and -3 both attract a correction of 1.8 dB).

Difference between the two noise levels (db) (+/-)	Add this correction to the higher noise level (db)
0	3.0
1	2.5
2	2.1
3	1.8
4	1.5
5	1.2
6	1.0
7	0.8
8	0.6
9	0.5
10	0.4
11	0.3
12	0.3
13	0.2
14	0.2
15	0.1

4. GLOSSARY OF TERMS

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-weighting 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 certifies 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 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). Defines uses of land and buildings and puts these into various categories known as 'Use Classes'.

AMENDMENTS ISSUED SINCE PUBLICATION

Document number	Amendment details	Date
1.0	First Issue	19/08/2011
1.1	Clarification to Step 10 under Air Source Heat Pumps. New explanatory note added to wind Step 3.	22/07/2013
1.2	Updated definitions and section numbering.	01/05/2015
1.3	Rebranding of document, update of email and website addresses and cosmetic changes.	19/06/2019

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