

DECIBEL - Main Result

Calculation: Analiza akustyczna - wariant proponowany H=138.4 m, z = 0,0 [-]

Noise calculation model:

ISO 9613-2 General

Wind speed:

10,0 m/s

Ground attenuation:

General, fixed, Ground factor: 0,0

Meteorological coefficient, C0:

0,0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

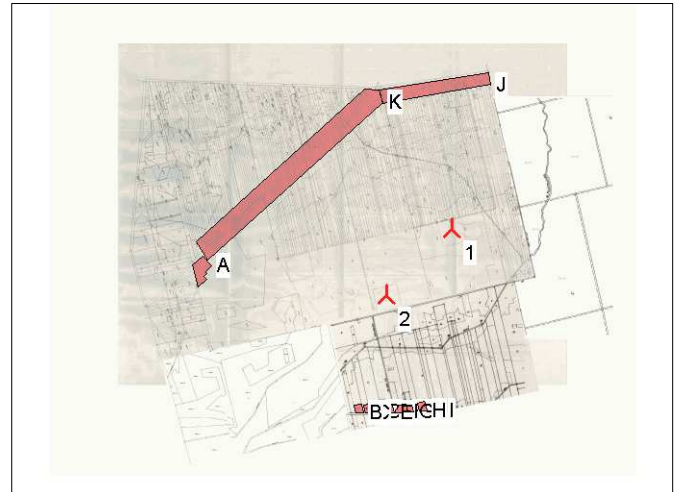
Pure and Impulse tone penalty are added to WTG source noise

Height above ground level, when no value in NSA object:

4,0 m Allow override of model height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0,0 dB(A)



Scale 1:40 000

New WTG

Noise sensitive area

WTGs

| Longitude | Latitude | Z | Row data/Description | WTG type | | | | Noise data | | | | Wind speed [m/s] | LwA,ref [dB(A)] | Pure tones |
|-----------|----------------|----------------|----------------------|----------|-----------|----------------|-------------------|--------------------|----------------|---------|---|------------------|-----------------|------------|
| | | | | Valid | Manufact. | Type-generator | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Creator | Name | | | |
| 1 | 20°27'56,75" E | 51°03'55,77" N | 254,9 EW3 | Yes | ENERCON | E-82 E2-2 300 | 2 300 | 82,0 | 138,4 | EMD | Level 0 - man.spec. - Op.Mode I - 04/2010 | 10,0 | 104,0 | No h |
| 2 | 20°27'38,83" E | 51°03'44,12" N | 254,0 EW2 | Yes | ENERCON | E-82 E2-2 300 | 2 300 | 82,0 | 138,4 | EMD | Level 0 - man.spec. - Op.Mode I - 04/2010 | 10,0 | 104,0 | No h |

h) Generic octave distribution used

Calculation Results

Sound Level

| No. | Name | Longitude | Latitude | Z [m] | Imission height [m] | Demands | | Distance to noise demand [m] | Demands fulfilled ? |
|-----|---------|----------------|----------------|-------|---------------------|---------------|-------------------------------|------------------------------|---------------------|
| | | | | | | Noise [dB(A)] | Sound Level From WTGs [dB(A)] | | |
| A | R1 | 20°26'50,95" E | 51°03'49,40" N | 254,3 | 4,0 | 45,0 | 35,3 | 641 | Yes |
| B | R2 | 20°27'31,99" E | 51°03'25,25" N | 250,0 | 4,0 | 45,0 | 39,3 | 299 | Yes |
| C | R3 | 20°27'33,85" E | 51°03'25,18" N | 250,4 | 4,0 | 45,0 | 39,4 | 294 | Yes |
| D | R4 | 20°27'37,14" E | 51°03'25,00" N | 251,1 | 4,0 | 45,0 | 39,5 | 291 | Yes |
| E | R5 | 20°27'40,56" E | 51°03'25,01" N | 252,8 | 4,0 | 45,0 | 39,5 | 289 | Yes |
| F | R6 | 20°27'44,08" E | 51°03'25,19" N | 254,3 | 4,0 | 45,0 | 39,6 | 290 | Yes |
| G | R7 | 20°27'44,52" E | 51°03'24,94" N | 254,4 | 4,0 | 45,0 | 39,4 | 299 | Yes |
| H | R8 | 20°27'47,41" E | 51°03'25,42" N | 255,5 | 4,0 | 45,0 | 39,5 | 297 | Yes |
| I | R9 | 20°27'51,29" E | 51°03'25,63" N | 255,5 | 4,0 | 45,0 | 39,4 | 314 | Yes |
| J | MN/RM | 20°27'46,61" E | 51°04'18,79" N | 268,3 | 4,0 | 40,0 | 37,7 | 167 | Yes |
| K | MN/RM_1 | 20°27'22,51" E | 51°04'09,18" N | 269,5 | 4,0 | 40,0 | 38,3 | 131 | Yes |

Distances (m)

| WTG | | |
|-----|------|------|
| NSA | 1 | 2 |
| A | 1296 | 946 |
| B | 1059 | 598 |
| C | 1045 | 593 |
| D | 1024 | 591 |
| E | 1001 | 591 |
| F | 976 | 594 |
| G | 974 | 603 |
| H | 943 | 601 |
| I | 930 | 620 |
| J | 735 | 1041 |
| K | 755 | 786 |

DECIBEL - Detailed results

Calculation: Analiza akustyczna - wariant proponowany H=138.4 m, z = 0,0 [-] **Noise calculation model:** ISO 9613-2 General 10,0 m/s
Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
 (when calculated with ground attenuation, then Dc = Domega)

| | |
|----------|--|
| LWA,ref: | Sound pressure level at WTG |
| K: | Pure tone |
| Dc: | Directivity correction |
| Adiv: | the attenuation due to geometrical divergence |
| Aatm: | the attenuation due to atmospheric absorption |
| Agr: | the attenuation due to ground effect |
| Abar: | the attenuation due to a barrier |
| Amisc: | the attenuation due to miscellaneous other effects |
| Cmet: | Meteorological correction |

Calculation Results

Noise sensitive area: A R1

| | | Wind speed: 10,0 m/s | | | | | | | | | | |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1 | 1 296 | 1 303 | 30,29 | 104,0 | 0,00 | 73,30 | - | - | 0,00 | 0,00 | - | 0,00 |
| 2 | 946 | 955 | 33,67 | 104,0 | 0,00 | 70,60 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 35,31

- Data undefined due to calculation with octave data

Noise sensitive area: B R2

| | | Wind speed: 10,0 m/s | | | | | | | | | | |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1 | 1 059 | 1 068 | 32,47 | 104,0 | 0,00 | 71,57 | - | - | 0,00 | 0,00 | - | 0,00 |
| 2 | 598 | 614 | 38,29 | 104,0 | 0,00 | 66,76 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,30

- Data undefined due to calculation with octave data

Noise sensitive area: C R3

| | | Wind speed: 10,0 m/s | | | | | | | | | | |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1 | 1 045 | 1 054 | 32,62 | 104,0 | 0,00 | 71,46 | - | - | 0,00 | 0,00 | - | 0,00 |
| 2 | 593 | 609 | 38,37 | 104,0 | 0,00 | 66,69 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,40

- Data undefined due to calculation with octave data

Noise sensitive area: D R4

| | | Wind speed: 10,0 m/s | | | | | | | | | | |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1 | 1 024 | 1 033 | 32,83 | 104,0 | 0,00 | 71,28 | - | - | 0,00 | 0,00 | - | 0,00 |
| 2 | 591 | 607 | 38,40 | 104,0 | 0,00 | 66,66 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,47

- Data undefined due to calculation with octave data

Noise sensitive area: E R5

| | | Wind speed: 10,0 m/s | | | | | | | | | | |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1 | 1 001 | 1 010 | 33,07 | 104,0 | 0,00 | 71,09 | - | - | 0,00 | 0,00 | - | 0,00 |
| 2 | 591 | 607 | 38,41 | 104,0 | 0,00 | 66,66 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,52

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Analiza akustyczna - wariant proponowany H=138.4 m, z = 0,0 [-] **Noise calculation model:** ISO 9613-2 General 10,0 m/s

Noise sensitive area: F R6

| | | Wind speed: 10,0 m/s | | | | | | | | | | | |
|-----|-----|----------------------|----------------|--------------|---------|------|-------|------|------|------|-------|------|------|
| WTG | No. | Distance | Sound distance | Calculated | LwA,ref | Dc | Adiv | Aatm | Agr | Abar | Amisc | A | Cmet |
| | | [m] | [m] | [dB(A)] | [dB(A)] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| | 1 | 976 | 985 | 33,34 | 104,0 | 0,00 | 70,87 | - | - | 0,00 | 0,00 | - | 0,00 |
| | 2 | 594 | 608 | 38,38 | 104,0 | 0,00 | 66,68 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,56

- Data undefined due to calculation with octave data

Noise sensitive area: G R7

| | | Wind speed: 10,0 m/s | | | | | | | | | | | |
|-----|-----|----------------------|----------------|--------------|---------|------|-------|------|------|------|-------|------|------|
| WTG | No. | Distance | Sound distance | Calculated | LwA,ref | Dc | Adiv | Aatm | Agr | Abar | Amisc | A | Cmet |
| | | [m] | [m] | [dB(A)] | [dB(A)] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| | 1 | 982 | 991 | 33,28 | 104,0 | 0,00 | 70,92 | - | - | 0,00 | 0,00 | - | 0,00 |
| | 2 | 603 | 617 | 38,23 | 104,0 | 0,00 | 66,81 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,43

- Data undefined due to calculation with octave data

Noise sensitive area: H R8

| | | Wind speed: 10,0 m/s | | | | | | | | | | | |
|-----|-----|----------------------|----------------|--------------|---------|------|-------|------|------|------|-------|------|------|
| WTG | No. | Distance | Sound distance | Calculated | LwA,ref | Dc | Adiv | Aatm | Agr | Abar | Amisc | A | Cmet |
| | | [m] | [m] | [dB(A)] | [dB(A)] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| | 1 | 955 | 964 | 33,58 | 104,0 | 0,00 | 70,68 | - | - | 0,00 | 0,00 | - | 0,00 |
| | 2 | 601 | 616 | 38,25 | 104,0 | 0,00 | 66,79 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,53

- Data undefined due to calculation with octave data

Noise sensitive area: I R9

| | | Wind speed: 10,0 m/s | | | | | | | | | | | |
|-----|-----|----------------------|----------------|--------------|---------|------|-------|------|------|------|-------|------|------|
| WTG | No. | Distance | Sound distance | Calculated | LwA,ref | Dc | Adiv | Aatm | Agr | Abar | Amisc | A | Cmet |
| | | [m] | [m] | [dB(A)] | [dB(A)] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| | 1 | 937 | 946 | 33,77 | 104,0 | 0,00 | 70,52 | - | - | 0,00 | 0,00 | - | 0,00 |
| | 2 | 620 | 634 | 37,95 | 104,0 | 0,00 | 67,05 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 39,36

- Data undefined due to calculation with octave data

Noise sensitive area: J MN/RM

| | | Wind speed: 10,0 m/s | | | | | | | | | | | |
|-----|-----|----------------------|----------------|--------------|---------|------|-------|------|------|------|-------|------|------|
| WTG | No. | Distance | Sound distance | Calculated | LwA,ref | Dc | Adiv | Aatm | Agr | Abar | Amisc | A | Cmet |
| | | [m] | [m] | [dB(A)] | [dB(A)] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| | 1 | 738 | 748 | 36,26 | 104,0 | 0,00 | 68,48 | - | - | 0,00 | 0,00 | - | 0,00 |
| | 2 | 1 082 | 1 088 | 32,27 | 104,0 | 0,00 | 71,74 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 37,72

- Data undefined due to calculation with octave data

Noise sensitive area: K MN/RM_1

| | | Wind speed: 10,0 m/s | | | | | | | | | | | |
|-----|-----|----------------------|----------------|--------------|---------|------|-------|------|------|------|-------|------|------|
| WTG | No. | Distance | Sound distance | Calculated | LwA,ref | Dc | Adiv | Aatm | Agr | Abar | Amisc | A | Cmet |
| | | [m] | [m] | [dB(A)] | [dB(A)] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| | 1 | 785 | 794 | 35,63 | 104,0 | 0,00 | 68,99 | - | - | 0,00 | 0,00 | - | 0,00 |
| | 2 | 837 | 845 | 34,98 | 104,0 | 0,00 | 69,54 | - | - | 0,00 | 0,00 | - | 0,00 |

Sum 38,33

- Data undefined due to calculation with octave data

DECIBEL - Assumptions for noise calculation

Calculation: Analiza akustyczna - wariant proponowany H=138.4 m, z = 0,0 [-]**Noise calculation model:** ISO 9613-2 General 10,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

10,0 m/s

Ground attenuation:

General, fixed, Ground factor: 0,0

Meteorological coefficient, C0:

0,0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Pure and Impulse tone penalty are added to WTG source noise

Height above ground level, when no value in NSA object:

4,0 m Allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0,0 dB(A)

Octave data required

Air absorption

| 63 | 125 | 250 | 500 | 1 000 | 2 000 | 4 000 | 8 000 |
|---------|---------|---------|---------|---------|---------|---------|---------|
| [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] |
| 0,1 | 0,4 | 1,0 | 1,9 | 3,7 | 9,7 | 32,8 | 117,0 |

WTG: ENERCON E-82 E2 2300 82.0 !O!

Noise: Level 0 - man.spec. - Op.Mode I - 04/2010

Source Source/Date Creator Edited

Enercon 2010-04-02 EMD 2012-07-13 16:50

According to manufacturer specification SIAS-04-SPL E-82 E2 OM I 2,3MW Rev1_0-ger-ger.pdf

| Status | Hub height [m] | Wind speed [m/s] | LwA,ref [dB(A)] | Pure tones | Octave data | | | | | | | | |
|--------------|-------------------|---------------------|--------------------|------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|------|
| | | | | | 63 [dB] | 125 [dB] | 250 [dB] | 500 [dB] | 1000 [dB] | 2000 [dB] | 4000 [dB] | 8000 [dB] | |
| From Windcat | 138,4 | 10,0 | 104,0 | No | Generic data | 85,6 | 92,6 | 96,0 | 98,6 | 98,4 | 95,5 | 90,7 | 81,2 |

NSA: R1-A

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R2-B

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R3-C

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R4-D

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

DECIBEL - Assumptions for noise calculation

Calculation: Analiza akustyczna - wariant proponowany H=138.4 m, z = 0,0 [-]**Noise calculation model:** ISO 9613-2 General 10,0 m/s

NSA: R5-E

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R6-F

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R7-G

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R8-H

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: R9-I

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 45,0 dB(A)

No distance demand

NSA: MN/RM-J

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

NSA: MN/RM_1-K

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

No distance demand