

Project: Cronalaght demonstration - Module descriptions	Description: The project has been modified to demonstrate WindPRO functionalities.	Printed/ Page 05-01-2010 11:56 / 1 Licensed user: EMD International A/S Niels Jernesvej 10 DK-9220 Aalborg Ø +45 9635 4444 Thomas Sørensen, ts@emd.dk Calculated: 05-01-2010 11:35/2.7.424
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DECIBEL - Main Result

Calculation: Decibel demonstration calculation

Noise propagation model:
 ISO 9613-2 United Kingdom
Wind speed:
 4,0 m/s - 12,0 m/s, step 1,0 m/s
Ground attenuation:
 General, Ground factor: 1,0
Type of demand in calculation:
 WTG noise is compared to ambient noise plus 5dB margin with the option of a floor setting (e.g. 35dB)
Noise values in calculation:
 All noise values are 90% exceedance values (L90) designed to show compliance with ETSU-R-97 limits
Pure tones:
 Pure and impulse tone penalty are added to WTG source noise
Calculation height above ground level:
 4,0 m
Octave band data required



Scale 1:50.000
 ▲ New WTG ■ Noise sensitive area

WTGs

IG	East North Z			Row data/Description	WTG type			Noise data			First wind speed [m/s]	LwaRef [dB(A)]	Last wind speed [m/s]	LwaRef [dB(A)]	Pure tones	Octave data	
	East	North	Z		Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]							Creator Name
1	186.487,9	423.847,0	289,0	VESTAS V90 3000 90.0 ICI hub...	Yes	VESTAS	V90-3.000	3.000	90,0	80,0	EMD	Level 0 -- 109,4 dB(A) - 03-2007	4,0	97,0	12,0	105,7	0 dB Generic *
2	186.029,8	423.995,1	273,4	VESTAS V90 3000 90.0 ICI hub...	Yes	VESTAS	V90-3.000	3.000	90,0	80,0	EMD	Level 0 -- 109,4 dB(A) - 03-2007	4,0	97,0	12,0	105,7	0 dB Generic *
3	185.885,6	424.429,3	295,1	VESTAS V90 3000 90.0 ICI hub...	Yes	VESTAS	V90-3.000	3.000	90,0	80,0	EMD	Level 0 -- 109,4 dB(A) - 03-2007	4,0	97,0	12,0	105,7	0 dB Generic *

*Notice: One or more noise data for this WTG is generic or input by user

Calculation Results

Sound Level

Noise sensitive area No.	Name	IG East	North	Z	Imission height [m]	Demands Max Noise demand [dB(A)]	Distance [m]	Sound Level		Demands fulfilled ?		
								Max From WTGs [dB(A)]	Max exceedance [dB(A)]	Noise	Distance	All
A	Dwelling A	185.242,1	423.021,3	110,0	4,0	39,5	360	33,7	0,0	Yes	Yes	Yes
B	Dwelling B	184.029,7	425.293,6	108,2	4,0	39,5	360	27,7	0,0	Yes	Yes	Yes
C	Hill	186.653,1	423.394,5	250,0	4,0	45,0		41,6	1,4	No		No

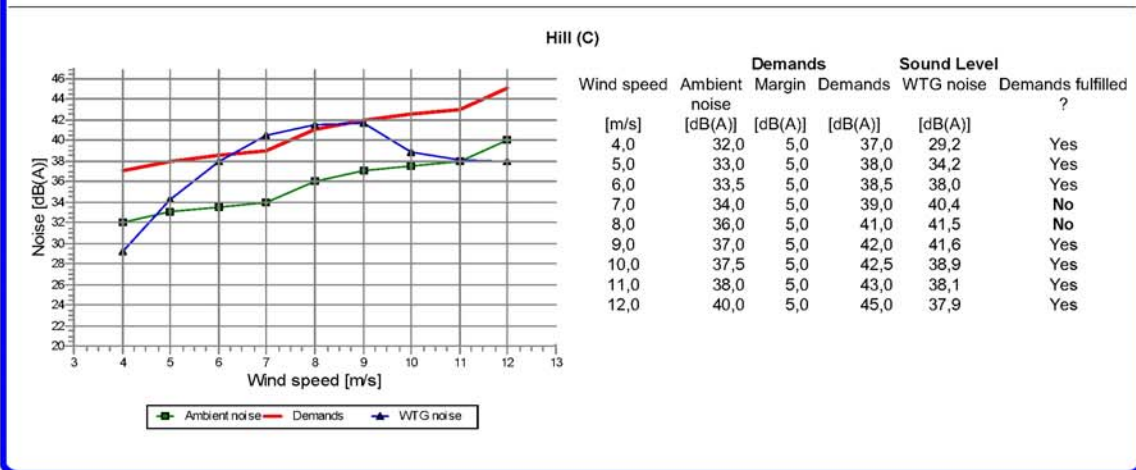
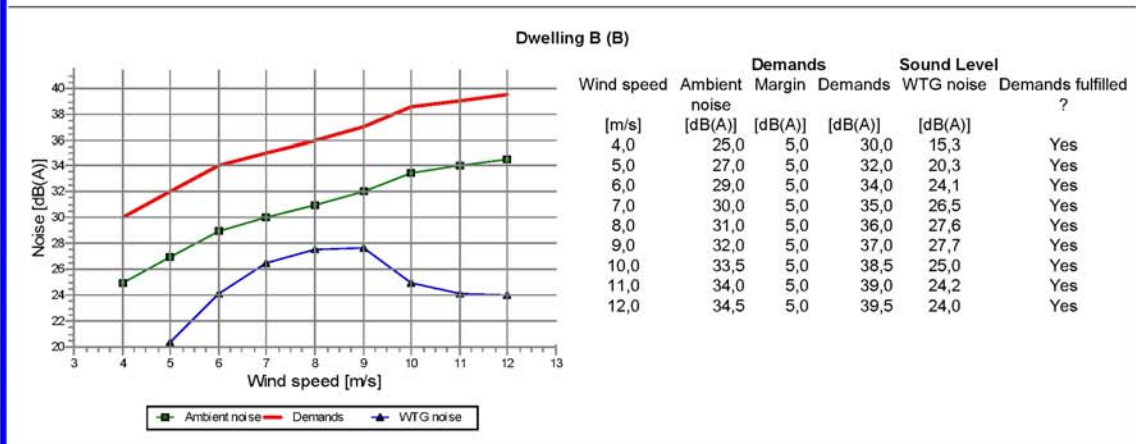
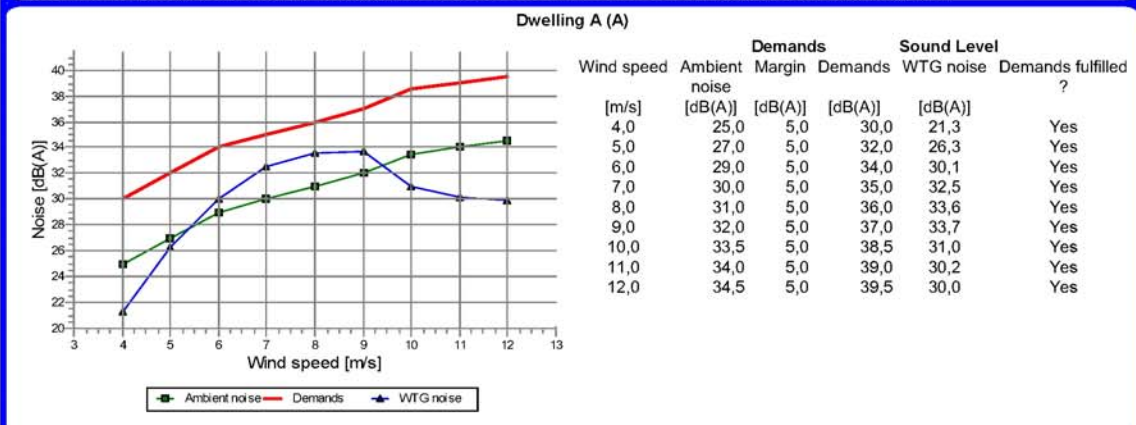
Distances (m)

NSA	WTG		
	1	2	3
A	1495	1252	1540
B	2852	2385	2029
C	482	829	1278

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DECIBEL - Detailed results

Calculation: Decibel demonstration calculation Noise calculation model: ISO 9613-2 United Kingdom



WindPRO is developed by EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg Ø, Tlf. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

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DECIBEL - Assumptions for noise calculation

Calculation: Decibel demonstration calculation **Noise calculation model:** ISO 9613-2 United Kingdom

Noise calculation model:

ISO 9613-2 United Kingdom

Wind speed:

4,0 m/s - 12,0 m/s, step 1,0 m/s

Ground attenuation:

General, Ground factor: 1,0

Meteorological coefficient, C0:

0,0 dB

Type of demand in calculation:

3: WTG noise is compared to ambient noise plus margin (UK, AT etc.)

Noise values in calculation:

All noise values are 90% exceedance values (L90)

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 Don't 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: VESTAS V90 3000 90.0 !O!

Noise: Level 0 - - 109,4 dB(A) - 03-2007

Source	Source/Date	Creator	Edited
Manufacturer	19-03-2007	EMD	20-11-2007 12:03

Noise data for standard operation (level 0) based on technical specification no.: 950011.R11, dated 19-03-2007. Please contact Vestas on information on the latest noise data. Accuracy = +/- 2 dB(A)

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	80,0	4,0	97,0	No	Generic data	76,6	83,6	87,0	89,6	89,4	86,5	81,7	72,2
From Windcat	80,0	5,0	102,0	No	Generic data	81,6	88,6	92,0	94,6	94,4	91,5	86,7	77,2
From Windcat	80,0	6,0	105,8	No	Generic data	85,4	92,4	95,8	98,4	98,2	95,3	90,5	81,0
From Windcat	80,0	7,0	108,2	No	Generic data	87,8	94,8	98,2	100,8	100,6	97,7	92,9	83,4
From Windcat	80,0	8,0	109,3	No	Generic data	88,9	95,9	99,3	101,9	101,7	98,8	94,0	84,5
From Windcat	80,0	9,0	109,4	No	Generic data	89,0	96,0	99,4	102,0	101,8	98,9	94,1	84,6
From Windcat	80,0	10,0	106,7	No	Generic data	86,3	93,3	96,7	99,3	99,1	96,2	91,4	81,9
From Windcat	80,0	11,0	105,9	No	Generic data	85,5	92,5	95,9	98,5	98,3	95,4	90,6	81,1
From Windcat	80,0	12,0	105,7	No	Generic data	85,3	92,3	95,7	98,3	98,1	95,2	90,4	80,9

NSA: Dwelling A-A

Predefined calculation standard: British

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

Ambient noise:

4,0 [m/s]	5,0 [m/s]	6,0 [m/s]	7,0 [m/s]	8,0 [m/s]	9,0 [m/s]	10,0 [m/s]	11,0 [m/s]	12,0 [m/s]
25,0 dB(A)	27,0 dB(A)	29,0 dB(A)	30,0 dB(A)	31,0 dB(A)	32,0 dB(A)	33,5 dB(A)	34,0 dB(A)	34,5 dB(A)

Margin or Allowed additional exposure: 5,0 dB(A)

Sound level always accepted: 30,0 dB(A)

Distance demand: 360,0 m

NSA: Dwelling B-B

Predefined calculation standard: British

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

Ambient noise:

DECIBEL

Noise Calculation

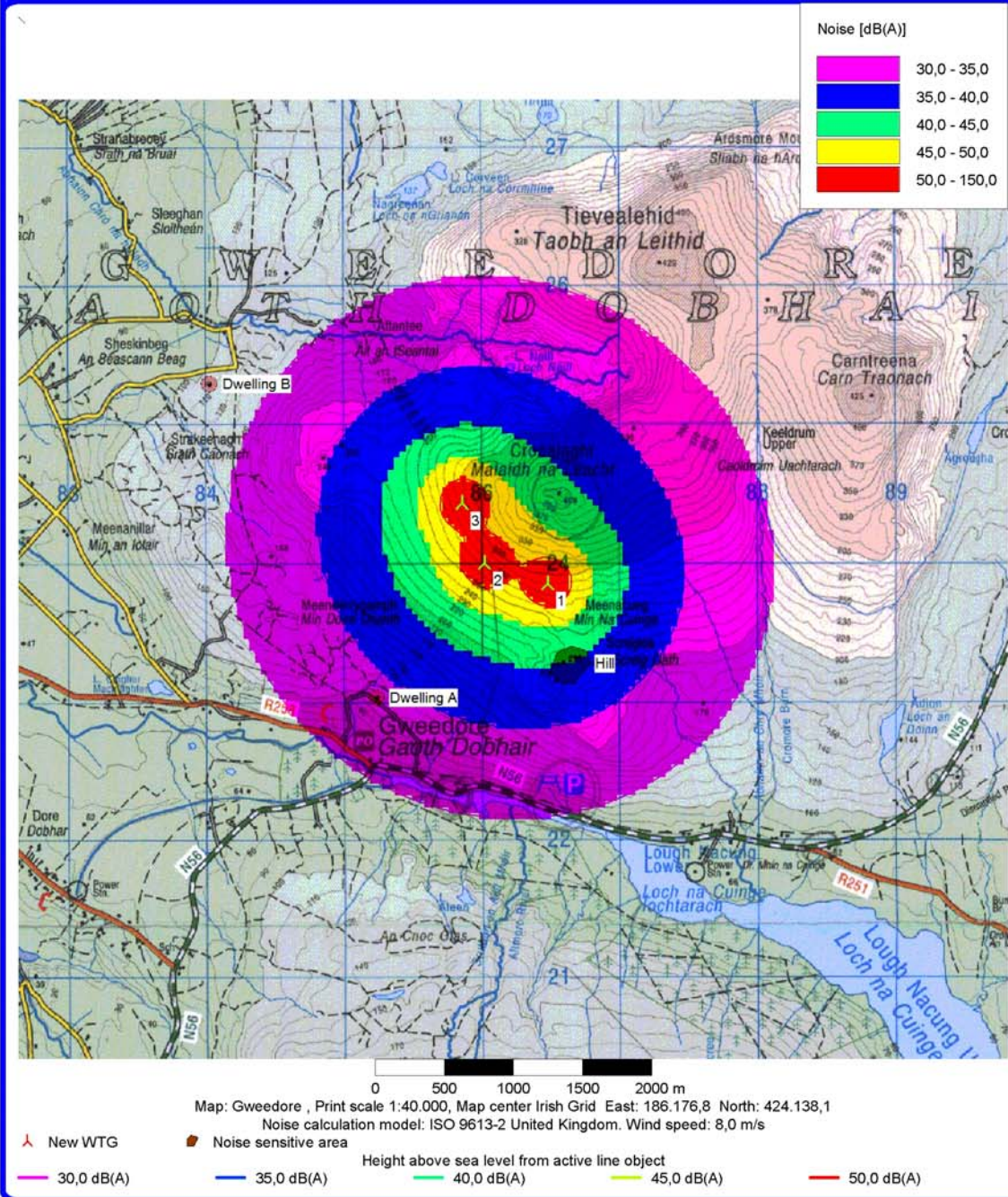


WindPRO version 2.7.424 Beta Jan 2010

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DECIBEL - Map 8,0 m/s

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DECIBEL

Noise Calculation

